Pacific Seabird Group

BULLETIN

Volume 13 Number 2 1986

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PACIFIC SEABIRD GROUP

BULLETIN

Volume 13 1986 Number 2

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THE CHAIR'S PAGE

There are rumors that bode ill for the conservation of seabirds in North America. We hear that some government agencies have changed priorities and that seabird management and research may be reduced if not eliminated. We hear rumors that some oil companies have changed their oil spill and clean-up policies. PSG cannot act on rumors. If you have some information that priorities have changed for better or worse, share it with the Conservation Committee.

PSG has been active on several conservation issues over the past few months. We commented on the Alaska Maritime National Wildlife Refuge plan. We suggested that the populations of all major seabird species should be monitored on a regular basis and that quantitative information about the interaction between fisheries and fish-eating seabirds should be collected. Problems related to commercial fisheries conflicts, waterborne pollutants, and oil spills should be investigated. This research should not be restricted to waters adjacent to the AMNWR because the threats to seabirds are most severe during the time that the birds are off refuge lands. We also encouraged the USFWS to continue its efforts to eliminate introduced predators from seabird nesting areas.

I sent a letter to the Endangered Species Office requesting that they down-list the California population of the Brown Pelican from "endangered" to "threatened." This action was recommended by members of the California Brown Pelican Advisory Committee.

I have exchanged several letters with Congressman Walter Jones about the funding of nongame wildlife programs, especially seabird research and management. The Conservation Committee plans to send government agencies a questionnaire about their past, current, and proposed seabird management and research activities.

Mark Tasker writes of the plight of the Andouin's Gull (*Larus audouinii*). Letters of support from PSG members may help persuade the Spanish Government to stop military activities that threaten this species. More information is included in the Conservation Section of this *Bulletin*.

A *Seabird Management Techniques Manual* is one project that will be discussed at the next Executive Council meeting. Some suggestions have already been made to include chapters on "Avoiding Research and Management Disturbance," "Marking Techniques," Survey Techniques," "Capturing and Handling," "Marking Techniques," "Environmental Impacts," "Food Habits," "Assessing Reproductive Success," and "Seabird Sanctuaries." PSG could use this manual to promote the research and conservation of seabirds. Please come to the La Paz Executive Council meeting or contact your Regional Representative if you are interested in this project.

I am pleased to announce that PSG has been successful in three more endeavors:

1. The 1985 Wetlands Symposium will be published in *Colonial Waterbirds*.

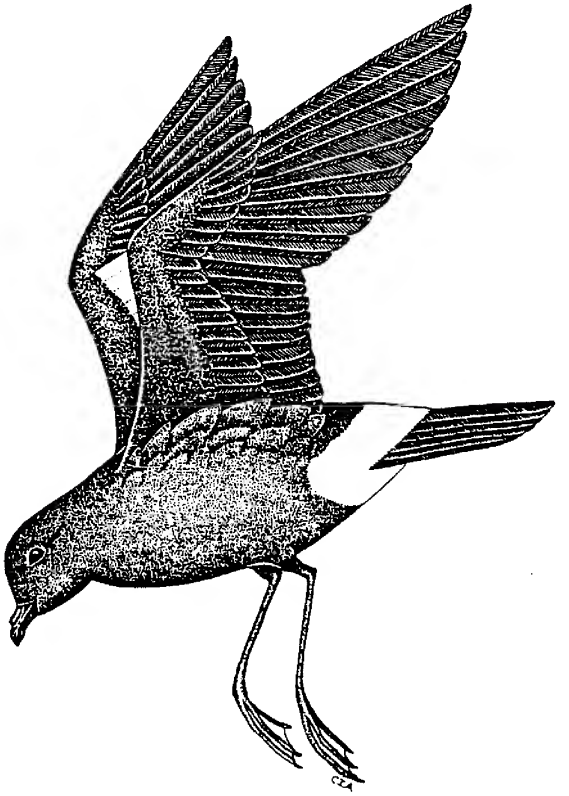
2. Thanks to the hard work and determination of Judith Hand and Bill Southern, the 1985 Gull Symposium will be published in the *Studies for Avian Biology* series.

3. David and Maria Jose Duffy have written the first issue of "Boletin de Aves Marinas Latinoamericana." Malcolm Coulter has already sent copies to researchers in Latin America.

Ken Briggs, Dan Anderson, and Juan Guzman have planned a *great* meeting in La Paz. There will be a symposium on the birds of the Gulf of California, a general paper session, and several field trips (including a fabulous bus trip from San Diego to La Paz!).

See you in sunny Baja!

Lora L. Leschner



PACIFIC SEABIRD GROUP NEWS

Treasurer's Report--1985

A change in accounting procedures and the correction of a bank error has resulted in a minor change in the balance sheet for 1985. The revised report is as follows:

CARRYOVER FROM 1984 (Checking: $1,095.01; Savings: $5,722.03)		$ 6,817.04
INCOME		
Dues and sales of back issues	$3,756.05	
Income from Long Beach Annual Meeting	1,634.88	
Life Memberships	2,025.00	
Interest on commercial accounts	181.40	
		7,597.33
EXPENSES		
Bulletin costs	2,041.27	
Officer's expenses	182.00	
General office expenses (filing fees, etc.)	18.50	
ICBP Dues	100.00	
San Francisco Annual Meeting	382.16	
Membership brochures	1,077.50	
Transfer to Endowment fund	5,000.00	
Service charges, bad checks	43.48	
		(8,844.91)
ENDOWMENT ACCOUNT		
Initial deposit	5,000.00	
Interest from 3 April to 31 December)	468.03	
		5,468.03
END OF YEAR BALANCE		$ 11,037.49
(Checking: $2,976.36; Savings: $2,593.10; Endowment: $5,468.03)		

Net increase in worth over 1984: $4,220.45

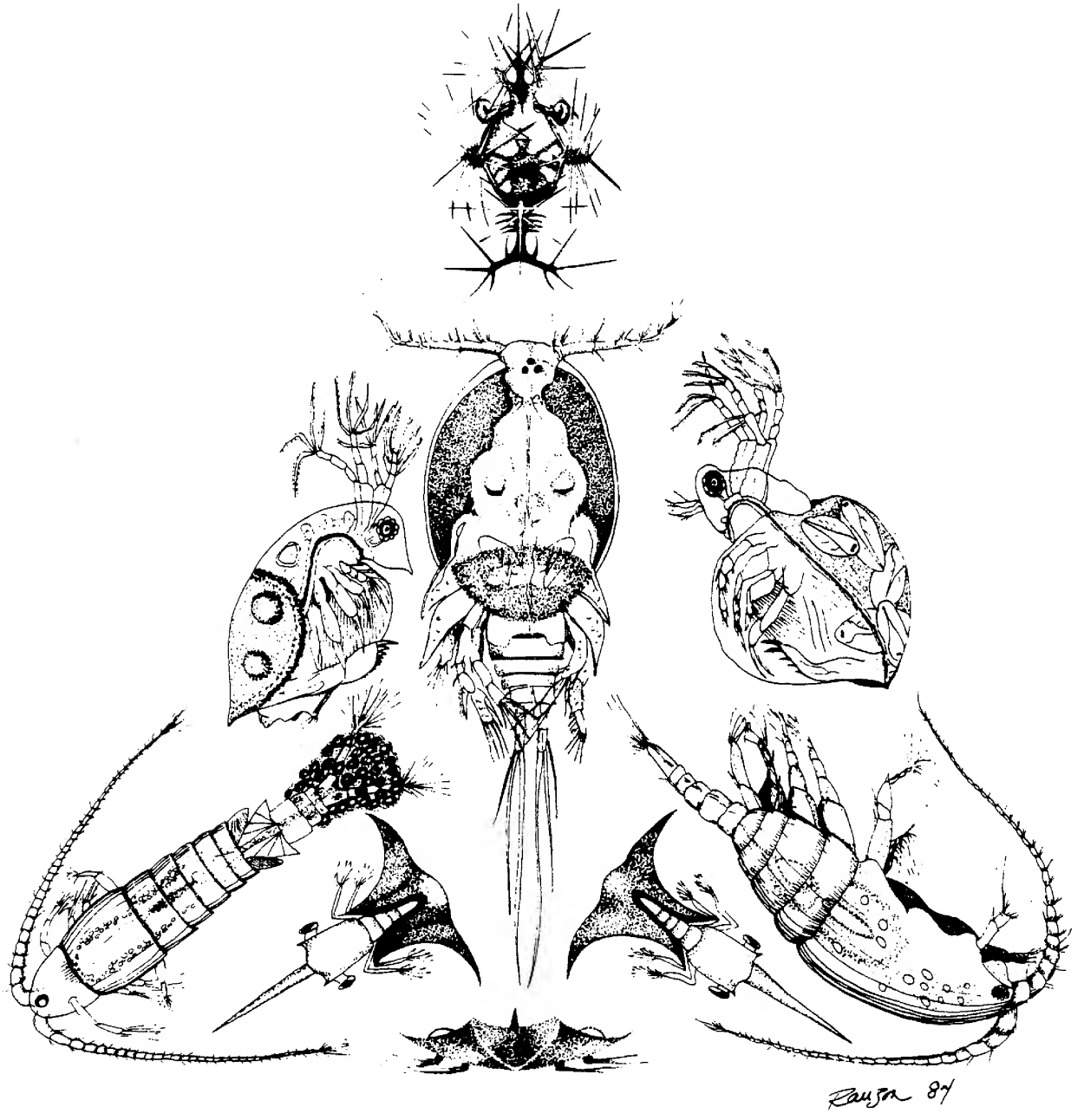
Overseas Bank Accounts

The Pacific Seabird Group now has a banking account in the United Kingdom. Overseas members may find it easier (and cheaper) to pay dues in pounds sterling, by postal giro, or international reply coupon. Be sure to send at the rate equivalent to U.S. $10.00 to the Treasurer.

1986 Annual Meeting

The 1986 annual meeting of the Pacific Seabird Group will be held 10-14 December 1986 in La Paz, Baja California Sur, Mexico. The meeting will feature a symposium on the biology of seabirds of the Gulf of California, organized by Dan Anderson (Department of Fisheries and Wildlife Biology, University of California, Davis, CA 95616) and Enriqueta Velarde (Instituto de Biologia, Departamento de Zoologia, Apartado Postal 70-153, 04510 Mexico D.F., Mexico).

Field trips are planned to islands of Bahia de La Paz and, perhaps, also to the desert and coast near Cabo San Lucas. The meeting is being held at the invitation of the Universidad Autonoma De Baja California Sur which will provide meeting space, local accommodations for students, and the annual banquet. A variety of air carriers, ferries, and bus routes serve La Paz; a bus/camping tour of Baja California is on the drawing board. A detailed announcement and call for papers will be mailed in July. To allow for difficulties in international communications and translation of the program to Spanish, a firm deadline of September 15 will be established for abstracts. Please begin to plan that talk or poster presentation soon. The La Paz Local Committee is chaired by Juan Guzman (Departamento de Biologia Marina, UABCS, Apartado Postal 214, La Paz, BCS, Mexico) and the Program Chairman is Kenneth Briggs (Institute of Marine Sciences, University of California, Santa Cruz 95064). "Be there!"



REGIONAL REPORTS

ALASKA, ED MURPHY

It has now been a decade since seabird research expanded dramatically and at least briefly flourished throughout Alaska under the auspices of NOAA's Outer Continental Shelf Environmental Assessment Program. In the past several years, the funding base for seabird research in Alaska has eroded considerably, but there are still numerous ongoing studies.

Colony Studies

Dave Irons (U.S. Fish and Wildlife Service [USFWS], Anchorage) will be monitoring kittiwake reproduction at colonies in Prince William Sound. Dave Nysewander (USFWS/Anchorage) will be supervising the monitoring programs at Middleton Island and Chiniak Bay in the Gulf of Alaska. Art Sowls (USFWS/Anchorage) will be monitoring the gull and cormorant colonies at Lake Louise and Skilak Lakes and assisting in the above studies. Mike Nishimoto (USFWS/Homer) will be monitoring the seabird colonies on Gull Island in Katchemak Bay and on Chisik Island. He will also monitor storm-petrels on East Amatuli Island (where Dee Boersma (Univ. Washington/Seattle) worked previously and also hopes to return this summer) and will make a short trip to St. Lazaria Island to see if storm-petrel densities are still low there. USFWS and National Park Service personnel will survey the Chiswell and Pye Islands in the Kenai Fjords region, replicating Ed Bailey's previous surveys there.

Ed Bailey (USFWS/Homer) will monitor Crested Auklets, kittiwakes, and horned puffins at Big Koniuji Island and the nearby Glaucous-winged Gull colony on Hall Island in the Shumigans Islands. Vern Byrd (USFWS/Homer) will supervise the studies of seabird numbers and reproductive success on the Pribilof Islands; Don Dragoo (Univ. Alaska, Fairbanks [UAF]) will be examining food habits of kittiwakes and murres on St. George Island also. Judy Sherburne (UAF) will be studying kittiwake reproductive behavior and success on Round Island in Bristol Bay. Dave Fisher (USFWS/Dillingham) will supervise monitoring of the Cape Peirce colony. Philip Martin, Brian Cooper, Ed Murphy (UAF), and Brian Lawhead (Alaska Biological Research, Fairbanks), will be studying numbers, reproductive success, and food habits of cliff-nesting seabirds on St. Matthew Island and Hall Island for the Minerals Management Service. Ed Murphy also will examine food habits of murres and kittiwakes of Bluff in Norton Sound during egg-laying and will return there in late summer to determine reproductive success. Alan Springer (FALCO/Fairbanks) will evaluate the Chukchi Sea. For the 12th year in a row, George Divoky (UAF, NOAA) will win the prize for the farthest north colony study for his work on Black Guillemots on Cooper Island near Barrow, provided the Army Corps of Engineers does not clean up the debris in which the guillemots are nesting there.

Coastal and Pelagic Studies

There are numerous studies of coastal waterfowl in Alaska, and some of these involve surveys in nearshore marine waters for waterfowl and other birds. Chris Dau (USFWS/Cold Bay) conducts year-round surveys of marine waterfowl in lagoons and estuaries of the lower Alaska Peninsula; Rod King (USFWS/Fairbanks) conducts spring surveys off the Alaska Peninsula which focus on Emperor Geese. Bob Gill (USFWS/Anchorage) will be studying fall staging Cackling Canada Geese in the Ugashik Bay area. Bill Eldridge (USFWS/Anchorage) is conducting coastal surveys of waterfowl and seabirds at the mouth of the Yukon River between April and October. Mike Spindler (USFWS/Kotzebue) will be conducting spring and fall surveys of the Noatak,

Kobuk, and Selawik River deltas; these and past surveys of those areas focus primarily on waterfowl.

NOAA has requested proposals for surveys of seabirds and marine mammals in fall, winter, and spring in the Unimak Pass area, and Jay Nelson (USFWS/Anchorage) is presently completing a USFWS administrative report on seabird migration through Unimak Pass. In February, Declan Troy and others in LGL (Anchorage) completed the field portion of their study of seabirds in the North Aleutian shelf region; their study is funded by NOAA.

George Hunt (Univ. California, Irvine) will be supervising the third and final year of field-work on physical oceanography, plankton distribution, and abundance and foraging distributions of auklets near King Island, St. Lawrence Island, and St. Matthew Island in the Bering Sea. Hunt and his colleagues (e.g., Nancy Harrison, Zoe Eppley) are also examining seabirds and feeding associations of grey whales in the region.

Reports

LGL Alaska is conducting a literature review of the Unimak Pass - eastern Aleutian region for NOAA; the draft will be completed in late summer. Gerry Sanger anticipates that the USFWS report on "Interactions between commercial fisheries and seabirds" will be published by early summer. Jay Nelson, Leslie Slater and John Trapp will be completing a bibliography on "Human disturbance to colonial waterbird colonies" in fall 1986. John Trapp and Dave Nysewander have drafted an "Alaska Seabird Management Plan." Art Sowls is completing computerization of the seabird colony catalog and an archiving plan for seabird plot data. Together with John Trapp, he is compiling an annotated census technique and monitoring bibliography. Tony DeGange, Doug Forsell, and Linda Jones (USFWS/Anchorage) are completing a report entitled "Mortality of seabirds in the high-seas Japanese salmon mothership fishery, 1980-1984."

Note to Readers

I know of no other ongoing studies of seabirds in Alaska. I now have a rather extensive mailing list of people who may be working in Alaska. If you did not receive my request for information but are working on seabirds in Alaska or plan to do so in the future, please let me know so that I can include your name on the mailing list.

CENTRAL CALIFORNIA, D. MICHAEL FRY

Dan Anderson. (1) Northern California: a) with Debra Jaques, social structure of Brown Pelicans and pelican-associated roosts and the effects of human disturbance on behavior; b) pollutant monitoring of waterfowl populations in the California Central Valley; (2) Mexico: a) with Miguel Mora, acquisition of pollutants in coastal wetlands of western México by resident and migratory species; b) with Bob Meese, time-cativity and habitat use (radio telemetry) of Brown Pelicans at San Luis Island; c) annual variation and human disturbance in Gulf of California seabird populations (ENSO, etc.).

James R. Anderson and Michael W. Newcomer. Distribution and abundance of seabirds in Monterey Bay, with emphasis on effects of the 1983 ENSO, continuing gill netting, and the February 1986"Apex Houston" oil spill. This is a continuation of the work of Don Croll and Jo Guerrero.

Brian S. Fadely. (1) Water balance and osmoregulation of seabirds, particularly penguins; (2) with Daniel Costa, foraging energetics of seabirds, especially Little Blue Penguin of Australia.

D. Michael Fry. (1) Northern California: a) with Leslie Addiego, toxicology of crude oil and petroleum products to seabirds, primarily at rehabilitation centers and laboratory work; (b) with Dick Grau, analysis of data on effects of oil on Cassin's Auklets breeding on Southeast Farallon Island; (2) Hawaii: a) monitoring reproductive success and effects of oil on Wedge-tailed Shearwaters on Manana Island; b) toxicology of actue oil exposure to shearwaters; c) with Stuart Fefer, monitoring ingestion of plastics by seabirds and feeding of plastic to chicks of shearwaters and Sooty Terns.

Frank Gress. (1) With Dave Lewis, seabird monitoring program at Channel Islands National Park (Brown Pelican, Double-crested Cormorant, Western Gull, Snowy Plover, and Xantus' Murrelet on Santa Barbara and Anacapa Islands; Cassin's Auklet in artificial boxes on Prince Island); (2) activity budgets of Brown Pelicans using radio telemetry at Channel Islands.

Dave Lewis. (1) With Breck Tyler, aerial surveys of seabirds in the Gulf of the Farallons, in response to recent California oil spills; (2) with Breck Tyler and Gary Strachan, investigating a recently discovered Rhinoceros Auklet colony on Ano Nuevo Island, San Mateo County; (3) with Frank Gress, seabird monitoring program at Channel Islands National Park.

Chris Swarth and Marilyn Fogel. Study migrant Wilson's Phalaropes using salt ponds in south San Francisco Bay. Migration routes, migration timing, and prey assimilation will be analyzed using natural stable isotope tracers from blood and feather samples.

M. D. F. Udvardy. Currently finishing a major work on biogeography.

Kenneth I. Warheit. (1) Systematics and fossil history of the Sulidae and fossil history of the California Current seabird communities; (2) nesting habitat preference of Brandt's Cormorant on Southeast Farallon Island.

Point Reyes Bird Observatory Projects

A. Antarctic. David Ainley continues analysis of known aged skuas at Ross Island. Wayne and Susan Trivelpiece, with Geoff Geupel and Jannet Klemyr, continue studies of pygoscelid penguins in the South Shetland Islands.

B. Beached birds. Lynne Stenzel, Gary Page, and David Ainley are working on analysis and write-up of 14 years of beached bird census data from California. Gary Page, Harry Carter, and Glen Ford are developing methods to assess the impact of oil spills on seabirds based on experience gained during two recent spills in central California.

C. Coastal estuaries. Gary Page, Lynne Stenzel, and Nils Warnock are continuing studies of site fidelity of wintering Dunlins on Bolinas Lagoon. Don McCrimmon and Helen Pratt have begun studies of the bioenergetics of wading birds on Bolinas Lagoon. Gary Page is continuing work on the breeding biology and juvenile dispersal of Snowy Plovers with work being carried out on Monterey Bay by John S. and Ricky C. Warriner and Frances Bidstrup, at Point Reyes by Katherine Wilson, and at Morro Bay by LaVern Drake and Gregory Smith. Work is being carried out jointly by PRBO and the Monterey Bay Aquarium to raise Snowy Plovers in captivity for release in the wild. The dispersal and breeding success of wild and hand-reared birds will be compared in future studies. Censusing Black Rails and determining their habitat requirements in San Francisco Bay continues with Jules Evens and Gary Page as the main participants.

D. Equatorial Pacific. David Ainley, with Larry Spear and Chris Ribic, continues to examine the community structure in relation to oceanographic variability.

E. Mono Lake. Dave Shufford and Gary Page, jointly with Joe Jehl, are in the fourth season of determining the breeding success and population size of California Gulls.

F. Southeast Farallon Island. Harry Carter and Bill Sydeman are monitoring seabirds, with emphasis on the effect of age on breeding success in Brandt's Cormorants and Western Gulls. David Ainley continues to examine the spatial and temporal patterns in feeding relative to diet in Cassin's Auklet and Common Murre in the Gulf of the Farallons. Bob Boekelheide is analyzing effects of age on breeding success and time budgets in Brandt's Cormorants. Harry Carter and Phil Henderson are examining annual attendance patterns of Cassin's Auklets. Teya Penneman is analyzing parental roles in Common Murres.

EUROPE AND MARITIME CANADA, MARK L. TASKER

Colony Studies

In north Norway, Win Vader and Rob Barrett (Tromsø Museum) are censussing the large seabird colonies in Troms and Finnmark, particularly Nord-Fugløy, Hjelmsøy, Svaerholtklubben, Omgangsstuaran, and Syltefjord. Monitoring of the numbers, food, and breeding success of the colonies is also under way. A major seabird colony mapping project is nearing completion under the Auspices of the Norwegian Government Conservation Agency (DVF) in Troudheim. Arnthor Gardarsson (Univ. of Iceland) has been censussing the cliff-breeding seabirds of Iceland for the past three years. Small colonies were found by aerial survey and backed by aerial photographic transects. Results are expected shortly. Colony attendance, movements, and the food of auks are also being studied. The NICOS workshop on seabirds (reported elsewhere in this issue) covers much of the work being carried out there. D. H. S. Wehle is continuing his research on Double-crested Cormorants on Duck Island, Isles of Shoals, Maine. Over 1,100 fledglings have been banded since 1982 with more than 30 recoveries from the Atlantic and Gulf of Mexico coastal states. The size of the Duck Island cormorant colony has doubled in the last few years. Wehle's research concentrates on the population dynamics of the colony. Two European PSG members have been working on colonies outside the area. Ruud van Halewyn (Univ. of Utrecht) has been surveying

Aruba Island in the Caribbean. His studies have concentrated on the largest colony of the local sub-species of Sanwich Tern: Cayenne Tern (*Sterna sandvicensis eurygnatha*). Bill Bourne has visited a few of the seabird islands in the Falklands (Malvinas) for census and survey purposes.

In the United Kingdom, the Seabird Group has just started on a survey of all British and Irish seabird colonies in order to update information collected in 1969-70. The work is being coordinated by Clare Lloyd at the Nature Conservancy Council in Aberdeen. It is expected that the survey will last two field seasons, with the bulk of the work being undertaken in 1986. Mike Harris and Sarah Wanless of the Institute of Terrestrial Ecology at Banchory continue their long-term studies on Atlantic Puffin (1972-present), Common Murre (1981-present) and Razorbill on the Isle of May. The emphasis of this work is to obtain an understanding of the biology of these auks while conditions are good. Recently numbers of all the species have increased rapidly, but there is some evidence that the murre population now may have stabilized. As in many other parts of the world, they wonder about the effects of industrial fisheries on seabird populations. Mike has recently obtained a contract from the Nature Conservancy Council to develop and install a scheme to monitor numbers and biological parameters (e.g., adult survival, breeding output, food of chicks, etc.) of seabirds at several key colonies around Britain. This should ensure the continuation of the longer term studies for at least three more seasons.

Coastal and Pelagic Studies

Kjell Einar Erikstad and Karl-Birger Strann (Tromsφo Museum) are studying the distribution of seabirds at sea off the coast of north Norway and the southern Barents Sea. Surveys are being conducted from both aircraft and ships throughout the year. In addition, they have been studying the pelagic distribution of seabirds associated with the breeding colony on Bleiksφy. Other research projects from the museum include a study of seabirds as predators of ice fauna (in collaboration with the Norwegian Polar Institute); the feeding ecology of *Larus* gulls in north Norway; studies of the wintering seaduck in Troms and feeding studies of moulting Goosanders in the Tana River Estuary, Finnmark, where it seems that all male European Goosanders stage during autumn.

Summaries of work off Canada are included in the NICOS workshop report. In European waters, Mark Tasker (Nature Conservancy Council, Aberdeen) continues to lead the Seabirds at Sea Team studying pelagic distributions in the North Sea. Particular emphasis has recently been placed on the location of post-breeding concentrations of moulting auks and on the distribution of seabirds around colonies. In 1986, studies have expanded into the Atlantic west of Scotland. Other pelagic studies are expected shortly by workers in Denmark and the Netherlands. Andy Patterson has been observing birds from oil-drilling rigs off Spain.

Bill Bourne and Bill Curtis have been making regular observations from the shipping supply line from the United Kingdom to the Falklands (Malvinas) and South Georgia for the past four years. Their studies have concentrated on the southern winter and spring, where there are fewest other observations. The observations have coincided with a sudden uncontrolled expansion of fishing around the Falklands (Malvinas). Initial impressions are that the Tubenoses have been flourishing on wastes from the trawling. There has, however, been a worrying collapse of the Rockhopper Penguin and King Shag populations following the arrival of many Oriental squid-jiggers. Interpretation of this collapse is difficult since the birds and fishermen catch different species of squid.

GREAT LAKES AREA, HANS BLOKPOEL

Brock University

Ralph Morris plans in 1986 (1) to continue work with Common Terns at the Port Colborne (Lake Erie) colony to track seasonal changes in intraclutch hatching synchrony and (2) with J. W. Chardine to initiate a two-year study of Brown Noddies on the Culebra National Wildlife Refuge, Puerto Rico. They will examine parental care and reproductive energetics.

Canadian Wildlife Service, Ontario Region

Chip Wesoloh and John Struger plan to (1) continue monitoring of contaminants and embryonic viability in Herring Gull eggs, (2) continue following the incidence of deformities in Double-crested Cormorant chicks, and (3) begin studies of contaminants in Black-crowned Night Herons, Forster's Terns, and domestic ducks.

Hans Blokpoel and Gaston Tessier plan to (1) monitor the effectiveness of efforts to reduce Ring-billed Gull problems (scaring gulls, removal of eggs) in Toronto and Ottawa, (2) monitor the impact of Ring-billed Gulls on Common Terns in Toronto and on Caspian Terns in Lake Huron (with Jim Ludwig of Ecological Research Services, Boyne City, Michigan), and (3) survey Ring-billed Gull colonies on Canadian portions of Lake Erie and Ontario (by contractors Dora Boersma and Anne Harfenist).

Lakehead University, Thunder Bay

John P. Ryder, Vicky Johnston, and Beatrice Termaat continue investigations of Ring-billed Gull biology on Granite Island, Lake Superior. They have completed a project on gull morphometrics and are initiating a study of renesting in Ring-billed Gulls and relocation of female-female pairs. Reconnaissance of colonially nesting birds in the south Lake of the Woods area.

New York State Department of Environmental Conservation, Delmar

Robert L. Miller reports that surveys of Common Tern colonies will continue along the St. Lawrence River (including Canadian waters) and in eastern Lake Ontario. During recent years in the St. Lawrence, terns have been more successful at man-made navigational light structures than at natural island sites. Loss of nests and eggs to flooding, loss of young to Great Horned Owl predation, and the displacement to marginal nesting habitat by Ring-billed Gulls has caused poor reproductive success of Common Terns in these areas.

In 1986, the status of Common Tern nesting in the mouth of the Niagara River and at Buffalo Harbour in Lake Erie will be determined. Several man-made structures (breakwalls and water diversion weirs) have been identified as nesting sites. Increasing Ring-billed Gull populations are thought to be an important factor in causing Common Terns to occupy less desirable nesting locations.

Increasing local Ring-billed Gull populations have resulted in declining reproductive success of Common Terns nesting on the small islands of Oneida Lake. Surveys indicate an increase in gullnests (97 percent Ring-billed, 3 percent Herring Gulls) from 421 in 1979 to 2,329 in 1985. Although the number of Common Tern nests have not declined during this same period, their locations have shifted to islands habitats more susceptible to seasonal flooding and vandalism. A

concentration of Common Terns at few sites may have resulted in a high rate of egg predation by Ruddy Turnstones during 1984 and 1985. In 1986, wire grids will be erected at two island sites in an experimental effort to exclude Ring-billed Gulls from nesting at locations previously occupied by terns.

North Illinois University, DeKalb

Bill and Linda Southern are continuing their long-term studies of Ring-billed Gull breeding biology and behavior at the Calcite colony near Rogers City, Michigan. They are entering the 24th season of investigations in this colony. In 1986, continuing emphasis will be placed on mate fidelity, colony and nest site tenacity, reproductive success, and the effects of record-high Great Lakes water levels on colony size.

During the winter season, they are continuing their studies of Brown Boobies in the U. S. Virgin Islands. Principal questions being addressed pertain to growth and development, site tenacity, mate fidelity, impacts of human disturbance, and the effects of environmental variables on reproductive success.

Northwestern Michigan College, Traverse City

Bill Scharf is planning in 1986 to (1) determine the size of the nesting population of Common Terns in Michigan during all-time high water levels and document those colonies where management of the vegetation habitat and construction of nesting platforms would be beneficial for 1987 and (2) improve Common Tern nesting habitat at five known colony sites by cutting brush.

University of Washington, Seattle

Gary Shugart will carry out a two-year study of "The significance of signature characteristics in avian vocalizations." The project is a comparative study of mate and parent offspring recognition in Herring and Ring-billed Gulls in the Great Lakes.

INLAND REGIONAL REPORT, PAUL C. JAMES

Please note that, as of 1 September 1986, my address will be: Paul C. James, Biology Dept., Univ. of Calgary, 2500 University Drive N.W., Calgary, Alberta, Canada, T2N 1N4.

Canadian Union College

Bill Van Scheik has recently completed a four-year study on the thermal aspects of the reproductive ecology of the Double-crested Cormorant in southern Alberta.

University of Saskatchewan

Barbara Hanbidge has recently completed her second season of study of the feeding ecology of the Double-crested Cormorant at Dore Lake, Saskatchewan.

Some members of the Department of Veterinary Pathology are focussing their seabird studies on various aspects of petroleum oil toxicity and the diagnosis and investigation of diseases in wild populations. F. A. Leighton and C. Couillard are developing *in vitro* models of the systemic

toxicity of ingested oils in an attempt to provide a system for assessing the potential impact of various oils to birds without use of extensive experimental poisonings. Related studies are being undertaken to define the pathological mechanisms by which oils exert their systemic toxic effects. Attempts are being made to secure samples of birds that die from the effects of spilled oil to compare pathological findings in these with results from experimental studies.

As part of an ongoing study of spontaneous diseases in wildlife, G. Wobeser and F. A. Leighton regularly examine specimens of bird species commonly studied by PSG members. Die-offs of Western Grebes in a local nesting colony and of Herring and California Gulls at a municipal dump are examples of recent investigations. The researchers are interested in extending their studies of marine species and welcome collaboration with seabird biologists interested in disease studies.

OREGON, PALMER C. SEKORA

Oregon State University

Dr. Eric P. Hoberg of the College of Veterinary Medicine is continuing research with parasites from species of seabirds collected in geographic regions other than Oregon: (1) surveys of helminths from alcids and procellariiforms off the Washington coast, (2) ecology of parasitism by helminths in *Puffinus gravis* at Gough Island in the South Atlantic, (3) evolution and ecology of platyhelminth parasites of Alcidae in the Holarctic, and (4) coevolution and historical biogeography of cestodes (Tetrabothriidae) among antarctic seabirds and evolution of structure and food-webs in pelagic marine communities in the Southern Ocean. Dr. Hoberg is interested in acquiring specimens of seabirds from Oregon to examine for parasites. He is particularly interested in cooperating with those researchers who may be conducting collections of cormorants, petrels, shearwaters, auklets, guillemots, and murrelets of various species.

University of Oregon

Dr. Daniel H. Varoujean and Wendy Ann Williams of the Oregon Institute of Marine Biology are conducting a study of the nest locations and nesting habitat of the marbled murrelet in coastal Oregon. This study is funded by the Oregon Department of Fish and Wildlife Non-game Program.

U.S. Fish and Wildlife Service

The USFWS has established a marine bird biologist position at the Newport Marine Science Center. The position was filled in November 1985 with the transfer of Roy Lowe from the San Francisco Bay National Wildlife Refuge. Activities to date include: (1) surveys and observations of Aleutian Canada geese along the Oregon coast with special emphasis on the Semidi Islands population wintering near Pacific City in Tillamook County, (3) drafted a study proposal to determine reproductive impacts at Oregon seabird colonies from disturbances caused by aircraft and watercraft activities, (3) establishing study plots for various species of seabirds to document nesting chronology and annual reproductive success, and (4) in conjunction with Daniel Boone monitoring use and reproductive success of tufted puffins utilizing nest boxes on Goat Island.

Other

Michael R. Graybill of the Southern Slough Sanctuary and Dr. Janet Hodder of the Oregon Institute of Marine Biology (OIMB) are continuing to study the breeding biology of pigeon guillemots nesting among the timbers of piers at Coos Bay. In addition, specimen collection is being conducted for physiology studies at OIMB.

Michael R. Graybill and Dr. Janet Hodder are studying the nesting abundance, phenology, and fledging success of western gulls at Elephant Rock. They are also continuing the 14-year-old cormorant breeding biology study at OIMB.

Range Bayer is continuing a pelagic cormorant nest success study at Yaquina Head.

Robert L. Pitman is continuing a study, begun in 1979, of Leach's storm-petrels nesting on Saddle Rock. He is banding adult birds and chicks, collecting and analyzing stomach contents regurgitated by birds removed from mist nets and documenting breeding chronology and fledging success.

PACIFIC REGION, STEWART I. FEFER

This is the first regional report for the newly established Pacific Region. The 15 members from this region outside Hawaii were written to ask for a summary of their present projects involving seabirds and for nominations for regional representative. However, the response from the membership was very poor. I urge members from throughout PSG to provide their regional representatives with information on research and management programs as well as conservation issues. Only then can regional reports be representative in these areas.

Main Hawaiian Islands

A. Laysan albatross management: Laysan albatross have nested on Pacific Missile Range, Mana Kauai for several years and have been increasing on Kauai. During 1985-86, three nests were located on Kilauea NWR, and three chicks were hatched this year. For the first time, nesting was also reported on Molokai, and a significant increase in roosting birds has been noted on Oahu. On Oahu, albatross activity has been concentrated near active aircraft runways. Birds found roosting along the runways at Kaneohe Marine Corps Air Station and the Dillingham Airfield have been relocated to Sea Life Park where these birds will be part of a captive display. Chicks from the vicinity of the runway at Pacific Missile Range were also relocated to Sea Life Park for display purposes. These birds were considered a hazard to aircraft traffic at these sites by Federal Aviation Administration and military agencies. Birds on the Main Hawaiian Islands are believed to be adults or subadult birds from the Northwestern Hawaiian Island colonies. As the colonies in the Northwestern Islands increase, more birds would be expected to colonize the Main Hawaiian Islands. As a result, a plan to reduce the potential for airstrike hazards involving albatross on the Main Hawaiian Islands is being developed by State and Federal biologists.

B. Newell's shearwater recovery. The Kauai Electric Co. continues to replace existing streetlights with lights designed to shade the upward visibility of the light source. This program is designed to reduce shearwater fallout resulting from disorientation due to bright lights. An interagency committee is presently looking at other private light sources such as hotels and condominium developments to help reduce this hazard. Shearwater aid stations remain active. Tom Telfer, Department of Lands and Natural Resources, Lihue, Kauai.

C. Monitoring status of dark-rumped petrels in Haleakala National Park, Maui. Resource Management Division, Haleakala National Park, Maui.

D. Water loss of eggs from tropical seabirds. Studies involve red-footed boobies at Ulupau Crater, Oahu; wedge-tailed shearwaters at Manana Island, Oahu; and Bulwer's petrels on Manana Island. G. Causey Whittow, John A. Burns, School of Medicine, Univ. of Hawaii, Honolulu.

E. Embryonic thermoregularion in brown noddies on Manana Island. William Dawson (Director, Museum of Zoology, Univ. of Michigan) and G. Causey Whittow.

F. Seabird oil toxicity study, wedge-tailed shearwaters, Manana Island, Oahu. To determine the effects of crude oil exposure on breeding success of wedge-tailed shearwaters. M. Fry and C. R. Grau, Dept. of Avian Sciences, UC Davis.

G. Incidence and effects of plastics on wedge-tailed shearwaters on Manana Island, Oahu. M. Fry.

H. Inventory of breeding populations of selected offshore islands of Maui and Lanai. Cameron Kepler, USFWS, Maui.

Northwestern Hawaiian Islands

A. Survey and inventory of seabirds on the Northwestern Hawaiian Islands. S. Fefer, D. Hu, D. K. McDermond. USFWS, Box 50167, Honolulu, HI.

B. Monitoring seabird populations in the Northwestern Hawaiian Islands. Baseline information on breeding parameters including egg size, reproductive success, and chick growth were collected for black noddies, red-footed boobies, red-tailed tropicbirds, and masked boobies on Tern Island, French Frigate Shoals, and Laysan Island. S. Fefer, D. Hu, D. K. McDermond, R. Vetter, L. Martin, and J. Suther, USFWS, Honolulu.

C. Study of mortality, survival of Laysan albatross populations on Midway Island. Since the mid-1950's, tens of thousands of Laysan albatross have been banded on Midway. This study will analyze existing banding and recovery data and continue to band chicks and adults and recover adults in plots on Midway Island. This is part of a long-term study to determine survival and mortality of the various age classes of this species. Ralph and Elizabeth A. Schreiber. LA County Museum and S. Fefer.

D. Incidence and effect of plastic ingestion in Hawaiian seabirds. The incidence of plastic in six species of seabirds will be determined on Midway Islands, Laysan Islands, Tern Island, and Kauai. Species studied include black noddies, red-footed boobies, Laysan albatross, black-footed albatross, Bulwer's petrels, and wedge-tailed shearwaters. Plastic incidence will be determined from proventricular/stomach contents. The effect of plastic ingestion on the growth and survival of Laysan albatrsoss chicks will also be determined. Paul Sievert, Louis Sileo (National Wildlife Health Lab., Madison, WI) and S. Fefer.

E. Study on predation of great frigatebirds on sooty tern chicks at Midway Islands. Sheila Mahoney (Florida Atlantic Univ., Boca Raton, FL) and Russell Shea (Univ. Wisconsin, Madison, WI).

F. A comparison of water turnover and body temperature as a function of the thermal microenvironment of Laysan albatross and red-footed booby chicks on Eastern Island Midway. Sheila Mahoney.

G. Oxygen consumption, evaporative water loss, and temperature regulation of sooty tern chicks at Midway Island as a function of nest location. Russell Shea.

Central Equatorial Pacific

A. Monitoring seabirds at Christmas Island, Kiribati, and Johnston Atoll NWR. Studies involve frigatebirds (lesser and greater), masked boobies, red-footed boobies, red-tailed tropicbirds and include food habits, populations, egg size, reproductive success, and ehick growth. Ralph and Elizabeth A. Schreiber.

B. Predator control on Howland and Jarvis Island NWR's. During March-April 1986, an expedition to the equatorial Pacific NWR's was mounted to eradicate feral cats and determine the contents of drums left by the military after WWII. On Howland Island, 17 cats were eliminated, and the island appeared to be cat-free at departure. At least one subsequent trip is planned for this fall to determine if the eradication effort on Howland Island was a complete success and to remove contaminants and debris. We also visited Jarvis Island, searched for feral cats, and found none. We now have confirmed that the cat-eradication effort on Jarvis Island in 1982-83 was a complete success. D. Forsell, S. Berendzen, and S. Fefer. USFWS Honolulu.

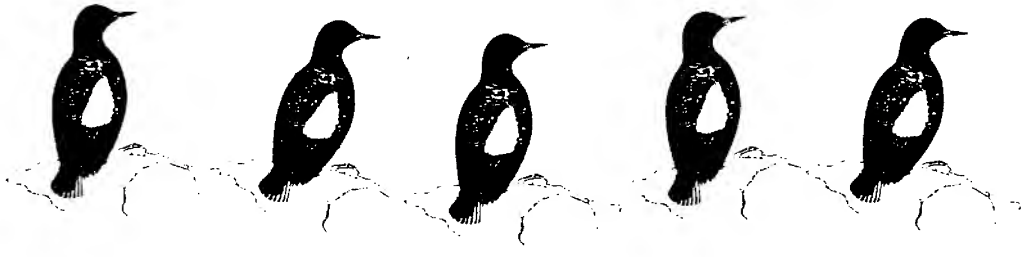
C. Monitoring seabirds on Jarvis, Howland Baker Island NWR's. During March-April, biologists visited these islands and conducted seabird surveys. A report on the effects of cat eradication on Baker Island will result from this expedition as comparative data from the 1960's (before cat eradication) is available from Pacific Ocean Biological Survey Project reports. Doug Forsell (USFWS), S. Berendzen and S. Fefer (USFWS, Honolulu).

South Pacific

The only report received from this area was from John Warham, Zoology Dept., Univ. of Canterbury, Christchurch, New Zealand. His current research activities include: (1) preparation of the biology of petrels - 2 vols., Academic Press, (2) preparation of a bibliography of the Procellariiformes, (3) preparation of the *Handbook of Australian Seabirds* with Angus and Robertson, and (4) preparation of *Penguin Research in New Zealand*.

Asia

Hiroshi Hasegawa continues to monitor, band, and color mark short-tailed albatross populations on Torishima Island.



WASHINGTON, STEVEN M. SPEICH

Batelle Pacific Northwest Laboratories, Richland

David Shea has completed his study and analysis of chlorinated hydrocarbon contaminants in body tissues and eggs of Great Blue Herons collected in western Washington. The results will appear in a joint paper with John Calambokidas (Cascadia) and Steven Speich (Wash. Dept. Game).

Richard Fitzner and Bill Gaines are doing a winter feeding ecology study of Harlequin Ducks in Sequim Bay, Washington.

Cascadia Research, Olympia

John Calambokidas has completed the analysis of body tissues and egg contents of Glaucous-winged Gulls collected in Puget Sound for chlorinated hydrocarbon contaminants. He was assisted by students at the Evergreen State College.

The Evergreen State College, Olympia

Janet Anthony and Eric Cummins (Wash. Dept. Game) are in the second year of a study of the nesting ecology of the Snowy Plover at Ocean Shores, Grays Harbor, Washington.

U.S. Fish and Wildlife Service

Ulric Wilson (Nisqually NWR) is continuing his studies on behavioral natural history of the Rhinoceros Auklet on Protection Island, Washington. He is also studying the distribution and abundance of marine birds, raptors, and marine mammals of the Washington Islands--San Juan Islands, Protection Island, Smith Island NWR--and is studying the distribution and abundance of wintering waterfowl in the eastern Strait of Juan de Fuca and Northern Puget Sound, Washington.

Larry Bluss and Chuck Henny (N.W. Field Station, Patuxant Wildlife Research Laboratory) and R. Fitzner (Batelle) have completed two studies in the western United States, of inorganic and organic contaminants in Great Blue Herons.

University of California, Berkeley (Museum of Vertebrate Zoology)

Douglas Bell, graduate student, is undertaking a systematic study of hybridization in the Glaucous-winged Gull and the Western Gull. Morphological, biochemical, and behavioral characters are being studied in the two gulls throughout their breeding ranges in California, Oregon, and Washington.

University of Washington, Seattle

Dennis Paulson is continuing research on shorebird migration and finishing a book on shorebird identification and a paper on procellariiform, cormorant, and alcid identification, both with emphasis on the Pacific Northwest/Northwest Pacific.

Walter Reid continues his research on the population dynamics and life history strategies of the Glaucous-winged Gull on Protection Island, Washington.

Walla Walla College, College Place

Ron Carter and Joe Galusha are studying cues important to the development of parent-young recognition in Glaucous-winged Gulls on Protection Island, Washington. They have experimental data suggesting that adult gulls do not recognize their chicks individually but behave parentally to any chick which acts appropriately. Another project on sibling recognition in this species is just getting under way.

May Kennett is considering the importance of the distance chicks remain from the nest as a cue in influencing parental care and recognition in Glaucous-winged Gulls on Protection Island, Washington.

Malinda McKee is studying the influence of age of chick and presence of sibling rates of artificial adoption in Glaucous-winged Gulls on Protection Island, Washington.

Washington Department of Game

Eric Cummins continues his annual censusing of the Caspian Tern and Ring-billed Gull colonies in Grays Harbor, Washington.

Lora Leschner is undertaking a project of capture, radio tag, and follow Marbled Murrelets in Puget Sound, in a study of foraging areas and nesting sites.

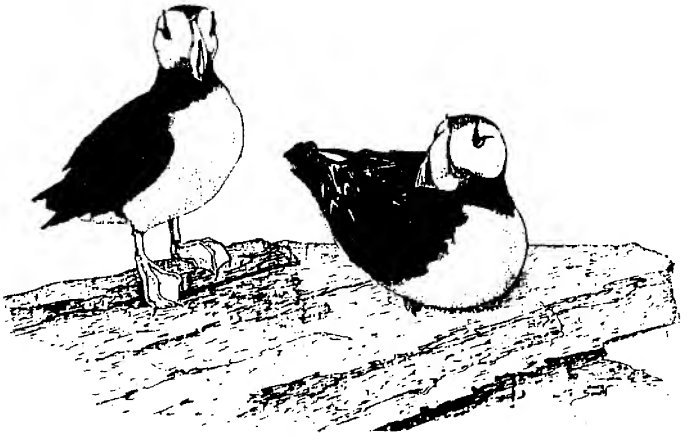
Steve Jeffries continues his annual aerial photography of nesting colonies of gulls, terns, and cormorants in Grays Harbor and Willapa Bay, Washington.

Ron Friesz is studying the methods of controlling nesting Ring-billed and California Gulls in eastern Washington.

Steven Speich is censusing nesting colonies of marine birds and monitoring reproductive success in the area of the December 1985 Port Angeles oil spill.

Washington State University, Pullman

John Hall is preparing a M.S. Thesis based on a study of the breeding behavior and biology of Forster's Terns on islands in the Columbia River, Benton County, Washington. He is working with Richard Fitzner (Batelle Pacific Northwest Laboratory).



CONSERVATION SECTION

Conservation Issues - Central California

A. Outer continental shelf oil development: policies of the State of California. A new platform (Chevron) is being placed on the northern boundary of the Channel Islands National Marine Sanctuary, six miles north of Anacapa Island, the largest and most important Brown Pelican breeding colony in California. Because of the close proximity of the platform to the colony, the State of California is attempting to get agreements for prior approval to use chemical dispersants in the event of an oil spill. At the present time, approval for the use of dispersants is not automatic, but is given only after a meeting of the Regional Response Team. Studies of toxicity of oil dispersants and dispersed oil are only just getting underway in California and are being conducted by the Marine Pollution Office of the California Department of Fish and Game. Everyone wishes we had better information with which to make a decision.

B. Gill netting of Common Murres by fishermen in the Gulf of the Farallons continues to be a problem. Large numbers of birds are being killed in nets each year. Burr Heneman continues to lobby for legislation.

Michael Fry

Conservation Issues - Alaska

The studies discussed in the Regional Report for Alaska are at least indirectly related to seabird conservation. Some studies are explicitly related to potential impacts of oil development (e.g., North Aleutians Shelf, St. Matthew Island). Other studies are focusing on potential interactions between commercial fisheries and seabird demography (e.g., studies on the Pribilof Islands and at Bluff). Gerry Sanger (USFWS/Anchorage) will be studying the diets of nestling puffins at several colonies in the Gulf of Alaska in conjunction with surveys for juvenile fishes by the National Marine Fisheries Science.

Chris Dau will be involved with studies of the behavior and energetics of Brant and other geese in response to aircraft overflights at Izembek Lagoon. Ed Bailey plans to complete the eradication of introduced red foxes on Big Koniuji Island. He also will visit Vliagn and Adugak Islands to evaluate the progress of the red fox vs. arctic fox biocontrol experiment on those islands.

Ed Murphy

Conservation Issues - Europe

Probably the most important issue in the region is the danger posed to Audouin's Gull by the increased use of its main breeding island by the Spanish armed forces. Rey Island, one of the three small Chafarinas Islands, holds over 50 percent of the world population of this endangered species (the total world population is about 4,000 pairs). The colony has been experiencing problems for some time through competition from an expanding Herring Gull population, and it seems likely that a change in military use of the island will only exacerbate the problem further. Due to the difficulty of obtaining precise information on the present activities on the island, it is difficult to assess the seriousness of the problem.

Mark L. Tasker

New York State Department of Environmental Conservation, Delmar

Robert L. Miller notes that new signs have been designed to alert the public to the location of tern nesting areas that should be avoided in order to reduce colony disturbance. A brochure is presently being developed to provide basic natural history information on the Common Tern, which is listed as a "threatened" species in New York State.

Upper St. Lawrence Tern Working Group

This group, composed of representatives of the Canadian Wildlife Service, U.S. Fish and Wildlife Service, National Audubon Society, university researchers, and the New York State Department of Environmental Conservation, meets annually to discuss and coordinate research and management programs on behalf of Common Terns and other colonial waterbirds in the St. Lawrence River region.

Major topics of concern include (1) the impact of increasing gull populations in the Great Lakes and the entire northeastern region of North America, (2) management and protection of Common Tern nesting habitats, and (3) developing methods to increase public awareness of colonial nesting birds requiring management attention.

U.S. Fish and Wildlife Service, Great Lakes Region, Fort Snelling, Minnesota

James C. Gritman noted that the Division of Habitat Resources will prepare a Fish and Wildlife Coordination Act Report for the U.S. Army Corps of Engineers that concerns enlargement of the Great Lakes connecting channels and harbors and navigation season extension. The report will contain recommendations for the protection of Great Lakes colonial waterbird nesting areas and for the creation of nesting islands. It will be finished by the end of 1986.

In Saginaw Bay, Michigan, and Green Bay, Wisconsin, they have sampled Common Terns, Forster's Terns, and double-crested Cormorants in order to establish the impacts of contaminants on reproductive success. Cross-bill deformities and hatching failures have been noted. Monitoring for anomalies will continue.

Wisconsin Department of Natural Resources, Green Bay and Madison

Tom Bahti and Summer Matteson report that a statewide population survey of nesting Common Terns and Forster's Terns and an inventory of potential nesting habitat are planned for 1986. Both tern species are listed as endangered in Wisconsin. Forty-eight artificial nesting platforms for Forster's Terns in the lower Green Bay area will be monitored. Common Tern nesting habitat will be improved by controlling vegetation and, possible, Ring-billed Gulls.

The Double-crested Cormorant will be deleted from the Wisconsin Threatened Species List, but its population will continue to be monitored.

Hans Blokpoel

Conservation Issues - Pacific Region

Hawaiian Islands National Wildlife Refuge Master Plan

The issuance of the Final Environmental Impact Statement/Master Plan was delayed almost an entire year due to the delay in review by the National Marine Fisheries Service. The Plan has now been officially finalized and will be sent to PSG.

Critical Habitat for the Hawaiian Monk Seal

This issue is indirectly related to seabirds in that added protection of the nearshore waters for seals around the Northwestern Hawaiian Islands would also further protect seabirds through additional protection of feeding areas. The National Marine Fisheries Service has proposed critical habitat within the 10-fathom contour around the Northwestern Hawaiian Islands excluding Maro Reef and Midway Islands. The Monk seal recovery team and other scientists knowledgeable about the Monk seal and their habitat requirements recommended 20 a fathom contour for critical habitat. Greenpeace is bringing suit against NMFS concerning this critical habitat designation.

Midway National Wildlife Refuge Overlay

This proposal is still being negotiated by FWS and the Navy. At this time, the resolution of this issue remains encouraging.

Stewart I. Fefer

Conservation Issues - Indian Island Pacific Ocean

An agency of the Federal Government of Australia is planning to destroy one of the most spectacular coastal rainforests and richest seabird colonies in the world. Because it is on the isolated Australian Territory of Christmas Island in the Indian Ocean, its plans have so far escaped the public attention that they deserve.

The agency is the Phosphate Mining Corporation of Christmas Island or PMCI. It is wholely owned and operated by the Australian Government through the Minister for Territories and is essentially moribund. For years it has experienced severe financial difficulty as markets have decreased, costs have risen and competition has increased. A private company would have folded years ago; however, because mining is the only industry on the island, the government has permitted it to continue while numerous inquiries have sought an alternative future for the island.

The hope of residents, now, is that the recent approval by the Federal Government of a five-star Hotel-Casino will be the catalyst for tourist development and alternative employment. No doubt, tourists would be attracted to the outstanding scenery and wildlife there is to offer if it can survive these final attempts of PMCI to prolong its existence.

For sheer massive destruction, the proposal by the Corporation to clear and mine the *South Point shore terrace* is without parallel on the island in recent years.

Currently this terrace is accessible only to four-wheel drive vehicles, and few islanders have seen or know of its beauty, let alone those off the island who are deciding its fate. It is a narrow 9 km x 200 m strip of rainforest bounded on one side by a rugged cliff coastline where waves pound constantly to form numerous blowholes and features (such as natural rock arches) and on the other by huge vertical limestone cliffs pockmarked with water-worn caves and ledges.

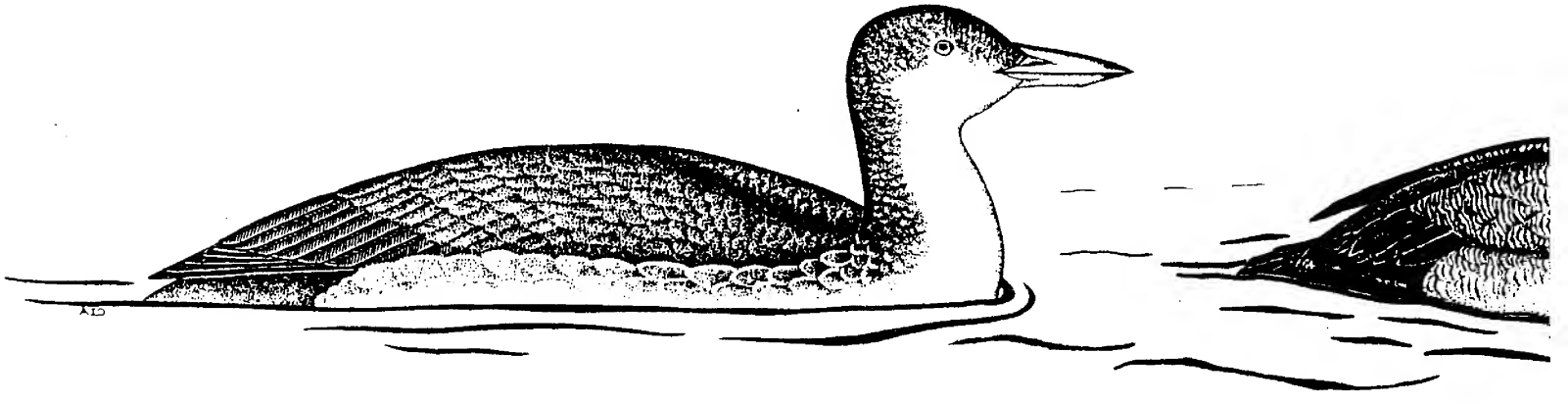
Possibly the highest concentration of nesting seabirds on the island, 14,000 or more, would have their habitat destroyed by the clearing. At present a view from the cliff and a walk in the forest reveals six species of frigatebird, tern, boobies, and tropicbirds nesting in abundance on the ground or cliff and in the trees. Five are supposedly protected under a migratory birds agreement with Japan.

Besides the enormous initial destruction, clearing and mining will undoubtedly reduce the breeding success of seabirds in many other parts of the island as the displaced birds attempt to nest in other colonies. The greatest concern is that the displaced birds could reduce the breeding success, and even threaten the survival, of the unique Christmas Island Frigatebird (world pop. 1,600 pairs) if they move into its colonies.

It seems that, at best, the mining could produce one-two years production from the enrichment plant. Is it really worth it?

The decision on the matter is now being made, primarily by the two Ministers below. To express opposition to this destruction by PMCI in its dying throes, please write immediately to each of -

1. Mr. G. Scholes, Minister for Territories,) Parliament House,
2. Mr. B. Cohen, Minister for Arts, Heritage and Environment) Canberra,
3. Senator G. Jones, Chairman, Senate Committee on Science, Technology and Environment) ACT 2600) Australia
4. Professor J. D. Ovington, Director, Australian National Parks and Wildlife Service, GPO Box 636, Canberra, ACT 2601, Australia.



INTERNATIONAL COUNCIL FOR BIRD PRESERVATION

Threatened birds of the Americas: the ICBP/IUCN Red Date Book, part 2

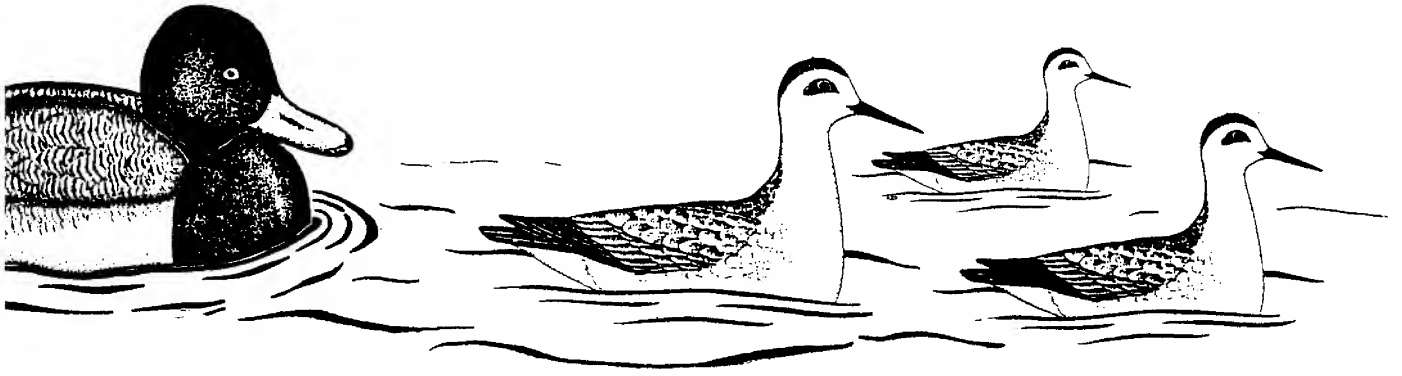
Nigel Collar has recently published *Threatened birds of Africa and related islands: the ICBP/IUCN Red Data Book part 1*. This is one of a number of projected volumes which will update and expand the red data Book. This volume runs over 800 pages and took several years to complete. Nigel is currently starting to write *Threatened birds of the Americas: the ICBP/IUCN Red Data Book, part 2*. The geographical areas to be considered include North, Central, and South America plus the Caribbean islands; related oceanic islands such as Bermuda, the Galapagos, the Aleutians, and Juan Fernandez islands; but Hawaii is excluded and will be treated in a subsequent volume concerning the Pacific Ocean. The language will be English, but there will be summaries in Spanish and Portuguese. Nigel has prepared a candidate list of species which can be obtained from him.

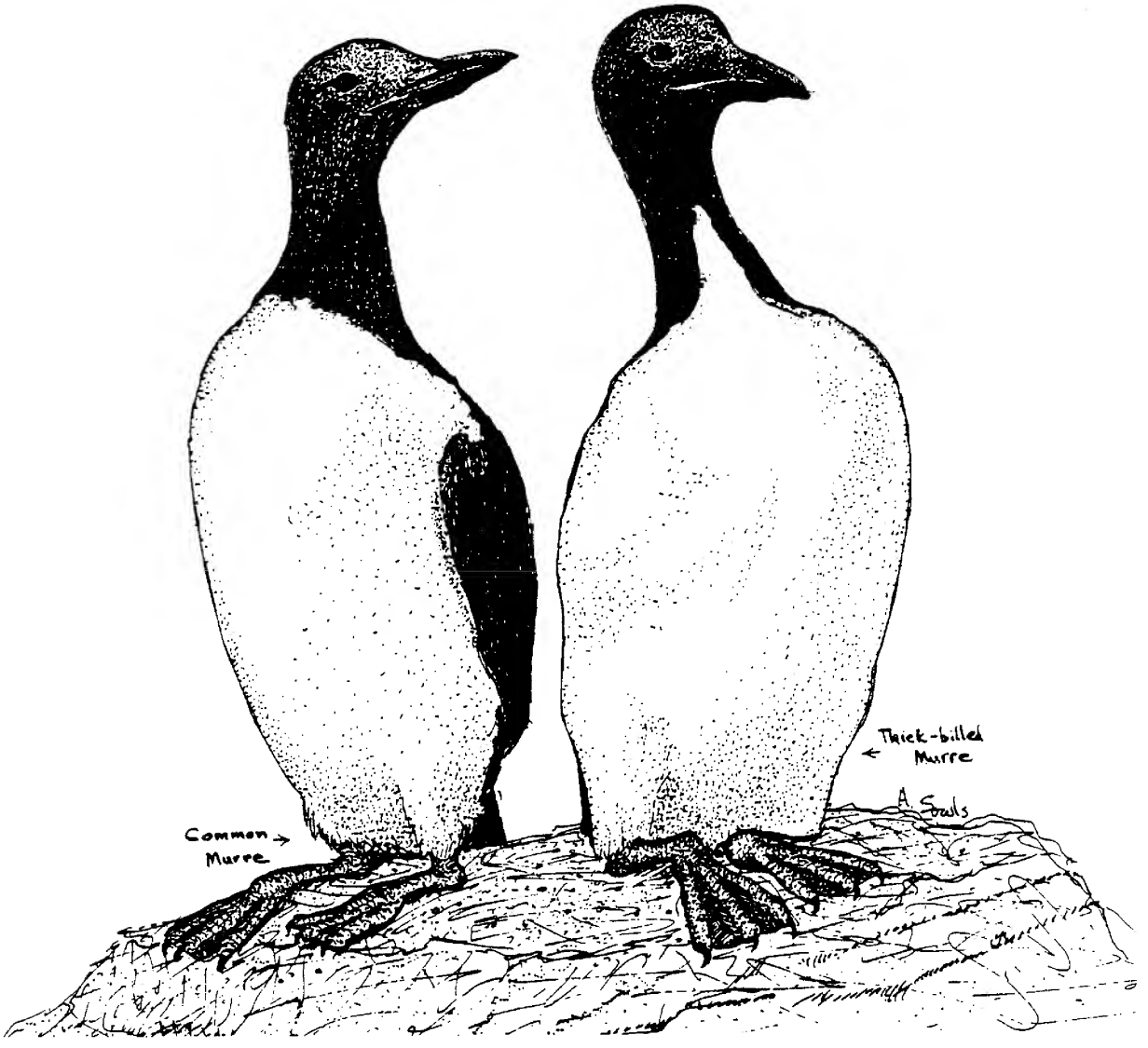
Your help will make a difference. For any species which is on his list or which you feel to be threatened and on which you have published information, please send a reprint or copy of your report. Please also write with details of those species for which you have unpublished information. If you have information concerning the conservation of the habitat or area from which a species is known, please send the material or at least indicate that you have it. Nigel can contact you for details. *Threatened birds of the Americas* aims to be both comprehensive in scope and exhaustive in detail.

Please remember that this book is intended to save birds from extinction. To be really valuable, the fullest information concerning all the candidate species and their habitats is needed. Every item of information will be credited to its source. Your cooperation will be gratefully appreciated. Please send information or questions to: Nigel J. Collar, ICBP, 219c Huntingdon Road, Cambridge CB3 0DL, United Kingdom.

Herons Specialist Group

The Herons Specialists Group will meet during the annual meeting of the Colonial Waterbird Group in Charleston, South Carolina, USA, 23-25 October1986. This group is sponsored by ICBP and the International Waterfowl Research Bureau. Its purpose is to provide a mechanism for information exchange and action regarding the conservation of herons and their habitats world-wide. Although the Old World section has been in operation for several years, the New World section has only recently been established. Those interested in participating in the work of the group are encouraged to attend the organizational meeting or to contact the chairmen--James A. Kushlan, Dept. of Biological Sciences, East Texas State Univ., Commerce, Texas 75428, USA (New World Co-Chair) and Heinz Hafner, Station Biologique de la Tour du Valat, Camargue, France (Old World Co-Chair).




Thick-billed Murre
Common Murre
A. Souls

NEWFOUNDLAND INSTITUTE FOR COLD OCEAN SCIENCE WORKSHOP ON MARINE BIRDS

St. John's, Newfoundland, Canada
23-26 March 1986
Bill Montevecchi, Workshop Coordinator

Research activity on seabords in eastern Canada has been increasing over the last decade, and there has been a considerable increase in activity in Newfoundland since the discovery of oil on the outer Grand Banks in 1980. By 1985, it was apparent that there was a growing need to bring people together to discuss current work and future research. A workshop seemed appropriate, with emphasis on the North Atlantic environment. With the sponsorship of the Newfoundland Institute for Cold Ocean Science (NICOS) and with help from the Canadian Wildlife Service, we held a workshop in St. Johns's, Newfoundland. The participants came from eastern Canada, St. Pierre et Miquelon, Norway, and Scotland to enjoy our remarkable St. John's weather, which included sun on Sunday, stun breezes (winds in excess of 50 knots) on Monday, and a glitter storm (freezing rain) on Tuesday.

Oral presentations were grouped into five sessions: (1) Diets/foraging/energetics, chaired by Bill Threlfall; (2) Birds at sea, chaired by Tony Diamond; (3) Seabirds as monitors of the marine environment, chaired by Michael Bradstreet; (4) Population dynamics, chaired by Ann Storey; and (5) Seabird Mortality, chaired by Richard Elliot.

These sessions were complemented by roundtable discussions that were designed to generate specific research recommendations whenever useful possibilities arose. The roundtable discussions focused on (1) use of colonies for research, (2) information needs for seabird models, (3) long-term monitoring, and (4) gull problems. The results of these discussions were summarized. Abstracts of these discussions have been included with the research abstracts since the same issues occur outside eastern Canada, and the recommendations are likely to be of interest to investigators elsewhere.

The meeting ended with the consensus that the effort was worthwhile and that another regional workshop would be organized for 1988.

Financial support for the workshop came from NICOS; thanks go to Roy Knoechel, Acting Director, for his help. Local arrangements were made by David Cairns and Richard Elliot. Special thanks to Bobbie Mayer for arranging the Chili and Beer Banquet. We thank Pacific Seabird Group for the opportunity to publish the abstracts of the workshop. We welcome inspiration from distant shores.

WORKSHOPS

WORKSHOP ON GULL PROBLEMS IN ATLANTIC CANADA

Chairman: R. D. Elliot (Canadian Wildlife Service, Box 9158, Stn. B, St. John's, Newfoundland, A1A 2X9, Canada)

Increases in both the number and boldness of Herring and Great Black-backed Gulls in Atlantic Canada over the last 30 years (and especially since 1975 in Newfoundland) have led to many problems in coastal areas. These changes reflect both the wide availability of food from garbage dumps and fish offal and declines in the numbers of gulls shot and eggs taken. Problems

reported in Newfoundland include the fouling of harvested fish, boats, docks and other property with droppings, the stealing of capelin and drying cod, the swallowing of bait from trawl-lines, and the effects of predation on eggs and chicks of Common Eiders, Atlantic Puffins, Common and Arctic Terns, and other birds in coastal areas.

Participants in the workshop considered ways to document recent changes in the distribution and number of gulls; to determine the magnitude and distribution of economic, health, and nuisance effects of these changes; and to evaluate management options to minimize detrimental effects.

It was recommended that a coastal aerial survey of breeding colonies conducted in the early 1970's be repeated in 1987. This should coincide with ground-truthing visits to selected colonies, particularly those for which historical records of breeding numbers exist. Preliminary banding of breeding Herring Gulls in Newfoundland indicates that most Newfoundland breeders leave the island in winter and and are largely replaced by gulls from eastern Canada. Extensive banding of gulls wintering at dumps was recommended to confirm this pattern.

It was suggested that biologists visit coastal communities during the summer (when most problems are reported) to record the conditions under which they occur and consider whether these situations could be altered easily. Researchers studying seabirds subject to gull predation agreed to monitor the gulls' activities and consider whether gull management could increase the seabirds' reproductive success.

It was agreed that discussion of specific management options was premature until problems were clearly defined. However, there was a consensus that culling be restricted to managing local problems such as the effects of specialized predators at remnant eider colonies. Participants strongly recommended that all management strategies include a public awareness program explaining the survey results, reasons for selection of specific management options, and ways individuals could reduce the local damaging effects of gull activity.

INFORMATION NEEDS FOR MODELS OF SEABIRD ENERGETICS (SUMMARY OF ROUND-TABLE DISCUSSION)

R. W. Furness (Zoology Dept., Glasgow Univ., Scotland, United Kingdom) and D. Schneider (NICOS, Memorial Univ., St. John's, Newfoundland A1B 3X7, Canada)

The group discussed modelling approaches that are most likely to be useful in the near future, with emphasis on the North Atlantic. Modelling is a useful tool for estimating fish consumption by birds, for investigating evolutionary adaptations, for estimating effects of oil spills, for testing hypotheses about marine ecosystems, for monitoring, for investigating interactions within seabird assemblages, for investigating sensitivity to environmental change, and for identifying important information needs. Several procedural considerations were discussed: appropriate levels of precision and complexity, use of submodels, focus on parameters that are precisely measured, use of multiple field techniques for validation, use of alternatively structured models, choice of appropriate time and space scales, appropriate species, and appropriate currency (energy, mass, or volume). Data needs were rated as feasible (F) and urgent (U). The data needs identified were bird diets (U F), activity and daily energy requirements (U F), foraging range (F), energy density of prey (F), fish stocks, bird numbers, demography, distribution, movements, prey-predator interactions, and interaction with the physical environment. The following research was recommended for the western North Atlantic: (1) Investigate the winter diets of seabirds in areas

of concentration, including ice edges; (2) Investigate variation in activity and daily energy expenditure, including multispecies comparisons; (3) Initiate long-term demographic studies based on marked individuals; (4) Increase our knowledge of colony sizes in Iceland; (5) Investigate behavioral interactions with prey, emphasizing responses to changes in the prey base.

WORKSHOP ON RESEARCH AND MANAGEMENT IN SEABIRD COLONIES

Chairman: A. J. Gaston (Canadian Wildlife Service, Ottawa K1A 0E7, Canada)

Disagreement between researchers and regulators has arisen in recent years over the use of seabird colonies in Newfoundland for research. The meeting gave an opportunity to air both sides of the argument, though researchers were overwhelmingly in the majority. No consensus was achieved, but the following approaches were identified as possible ways of minimizing future conflicts: (1) researchers should be more involved in the process by which research permits are issued; (2) further investigations of ways in which research may affect seabird populations, particularly the short- and long-term effects of different levels of disturbance and of given levels at different times of year, are desirable; (3) the option of creating zones for different activities within sanctuaries should be further considered; (4) greater effort should be made both by researchers and regulators to communicate with local people and with the public at large concerning the type of research being conducted and the results; (5) information on the effects of research activities and other forms of disturbance on seabird reproduction should be archived with CWS in St. John's; (6) consideration should be given to the establishment of a seabird research station in Newfoundland which would act as a focus for seabird research in eastern Canada and help to promote the exchange of information, ideas, and techniques.

There were doubts expressed about whether research activities pose any threat to seabirds provided that researchers use reasonable common sense. An eloquent plea was made on behalf of basic research. A central repository for information concerning Newfoundland seabirds is required, but university researchers were adamant that they would contribute only on the basis of complete reciprocity. Government data must be made readily available. No consensus was reached on the need to strengthen or enlarge the current system of provincial reserves to improve the statutory protection of seabird breeding areas. The government representatives retired.

ABSTRACTS

SEABIRDS OFF THE GALAPAGOS ISLANDS

Arnbom, T. A. (Dept. of Psychology, Memorial Univ., St. John's, Newfoundland A1B 3X9, Canada)

Although there have been many studies of the seabirds breeding on the Galapagos Islands, very little is known about where the birds go and what they do when away from the colonies. Birds were counted off the Galapagos Islands for two months, spring 1985. Data collected included species, numbers, age, and behavior. Environmental data such as water surface temperature was collected concurrently. An ANOVA on species by water temperature and water color showed no significant association. This may be attributed to the small scale on which the recordings were made. Distribution maps for seven species were generated from the bird counts. The maps showed an aggregation of birds south of Isabela Island, a known area for upwelling. Larger species of storm-petrels (*Oceanodroma* ssp.) were seen more often offshore than the smaller White-vented Storm-Petrel (*Oceanites gracilis*). Masked Booby (*Sula dactylatra*) and Blue-footed Booby (*Sula nebouxii*) were seen feeding in association with dolphins. A particular emphasis was placed on the

three following species which were recorded whenever sighted. Two of the chosen species were endemic or had pelagic distribution which were poorly documented. The third was included since it was endangered because of decreased breeding success (resulting from predation pressure by introduced mammals). The endemic Swallow-tailed Gull (*Larus furcatus*) were observed in breeding plumage 180 km west of the closest colony. Based on 20 sightings, which is twice the number of sightings to date, I suggest that the Eastern Tropical Pacific may be an important "nursing" area for non-breeding Parkinson's Petrel (*Procellaria parkinsoni*). From observing behavior and aggregations at sea, I present a method to determine locations for colonies and time of breeding of the endangered Dark-rumped Petrel (*Peterodroma phaeopygia*).

THE FOOD, GROWTH AND FLEDGING SUCCESS OF NORWEGIAN PUFFIN CHICKS *FRATERCULA ARCTICA* in 1980-1983

Barrett, R. T., F. Rikardsen, W. Vader (Zoology and Marine Biology Depts., Tromso Museum, Univ. of Tromso, 9000 Tromso), T. Anker-Nilssen (Zoological Museum, Univ. of Oslo, Sarsgt. 1, 0562 Oslo 5), K. Valde (Ornitologiske Undersokelser More og Romsdal., Postbox 206, 6001 Alesund), N. Rov, Directorate for Protection and Management of Nature, Tungasletta 2, 7000 Trondheim, Norway)

The breeding success of puffins *Fratercula arctica*, and the quality and quantity of food brought to their chicks were studied at 12 colonies along the coast of Norway in 1980-83. In the north and south of the country, breeding success was good while, prior to 1983, it was poor or a total failure at colonies in the central region. Evidence which suggests a direct relationship between the level of Herring *Clupea harengus* stocks and the breeding success of puffins at the latter colonies is presented.

ASHMOLE'S HALO: DIRECT EVIDENCE FOR PREY DEPLETION BY A SEABIRD

Birt, V. L., D. C. Goulet, D. K. Cairns, and W. A. Montevecchi (Depts. of Psychology and Biology and Newfoundland Institute for Cold Ocean Service, Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X9, Canada)

Ashmole (1963) proposed that seabirds deplete food resources around colonies, so producing "halos" of reduced fish populations. We measured benthic prey-fish densities at different distances from two colonies of double-crested cormorants (*Phalacrocorax auritus*) and found that prey-fish densities were significantly lower in bays used by cormorants for feeding than in those outside their foraging range. These findings are the first direct evidence that seabirds deplete fish around colonies and may thereby limit breeding success and population size.

ENERGETICS OF FREE-RANGING NORTHERN GANNETS DURING THE BREEDING SEASON

Birt, V. L., D. K. Cairns, S. Macko, and W. A. Montevecchi (Depts. of Psychology and Earth Sciences and Newfoundland Institute for Cold Ocean Science, Memorial Univ., St. John's, Newfoundland A1B 3X9, Canada)

Activity-specific energy expenditures were measured on 30 Northern Gannets (*Sula bassanus*) rearing chicks at Funk Island, Newfoundland, in 1984 and 1985 by use of doubly labeled water ($^3HH^{18}O$) and self contained activity timers. DEE averaged 2.72±.49 ml $CO_2 \cdot g^{-1} \cdot h^{-1}$ or 5270±875 $kJ \cdot d^{-1}$. Weight-specific energy expenditure decreased with body mass ($r = -.37$,

$P < .05$). DEE did not vary with year or sex, but was negatively correlated with chick age ($r = -.49$, $P < .05$). Multiple regression analysis of DEE against time in flight and time on water yielded estimates of energy expenditures of 411 $kJ \cdot h^{-1}$ for flight, 166 $kJ \cdot h^{-1}$ for sitting on water, and 85 $kJ \cdot h^{-1}$ for nest attendance ($r = +.82$, $P < .01$). These high energy expenditures are consistent with recent findings that many high latitude marine birds use significantly more energy than predicted by standard allometric equations.

WINTERING AND BREEDING SEABIRD POPULATIONS OF THE ST. PIERRE AND MIQUELON ARCHIPELAGO

Borotra, M., and A. Desbrosse (Service de l'Agriculture, B.P. 4244, St. Pierre et Miquelon, France)

The St. Pierre and Miquelon archipelago is located in ice-free waters off the south coast of Newfoundland. Common Eiders are the principal wintering seabird; about 2-5,000 individuals winter in the archipelago. Red-necked Grebes aggregate from May to October near the main freshwater lake (The Mirande), where more than 800 were recorded in early April 1983. This is the largest known concentration of Red-necked Grebes on the south coast of Newfoundland and possibly in eastern Canada.

Prior to 1979, hunting was permitted year-round. Changes since 1979 include the imposition of a May to October hunting season, restrictions on bag limit (alcids and seaducks), and the compilation of lists of game species and species having particular protection. Hunting, conducted with the aid of decoys near the coast, and the continual problem of oil spills every winter significantly increase seabird mortality. Beach surveys comparable to those conducted on the Avalon Peninsula were undertaken in 1983-86.

The 12 species of seabirds nesting on the archipelago are Leach's Storm-Petrel (ca. 100,000 pairs), Great Cormorant (ca. 80 pairs), Double-crested Cormorant, Great Black-backed, Herring, and Ring-billed Gulls (7-800 pairs), Common and Arctic Terns, Black Guillemot, and Atlantic Puffin. The probable nesting of the Northern Fulmar and Manx Shearwater will be investigated in future years.

THE USE OF PREDATORS AS SAMPLING AGENTS FOR ARCTIC COD

Bradstreet, M. S. W. (LGL Ltd., P. O. Box 457, King City, Ontario L0G 1K0, Canada)

Arctic cod, *Boreogadus saida*, are important in the diets of northern seabirds, but little is known of the biology of this small gadoid, partly because individuals are difficult to sample in ice-covered marine waters. In this study, 12,600 cod otoliths found in various predator samples and whole fish were studied. I found that ages of fish could be reliably determined by counting hyaline layers and that fish length could be reliably estimated from otolith length. I found significant regional differences in the age structure of Arctic cod populations and significant regional and temporal differences in cod growth. Mortality rates of cod were also determined. Regular collections of Arctic cod otoliths via predator stomach samples would permit an ongoing assessment of variability in the age structure, growth, and mortality of Arctic cod. Variability in these parameters probably influences the productivity of cod-dependent predators.

ACTIVITY BUDGETS AND FORAGING RANGES OF BREEDING COMMON MURRES

Cairns, D. K., K. A. Bredin, and W. A. Montevecchi (Newfoundland Institute for Cold Ocean Science and Psychology Dept., Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X9, Canada)

We used electronic activity recorders to measure flight time, dive time, and time on the water of breeding Common Murres (*Uria aalge*). During both incubation and chick-rearing, birds spent about 90 percent of their time away from the colony on the water or diving and 10 percent of their time flying. Chick-rearing murres spent 13.6 percent of their time at sea diving. The proportion of flight time did not vary with trip duration, though dive time tended to decrease with trip duration during the chick-rearing period. Potential foraging ranges calculated from flight times during individual foraging trips showed a concave frequency distribution, and median potential ranges were 37.8 km for incubating birds and 5.4 km for chick-rearing birds.

ENERGETICS AND PREY CONSUMPTION BY SEABIRDS BREEDING IN NEWFOUNDLAND

Cairns, D. K., W. A. Montevecchi, and V. L. Birt (Newfoundland Institute for Cold Ocean Science and Psychology Dept., Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X9, Canada)

A bioenergetics model was developed to estimate prey harvest by the five major offshore-feeding seabird species that breed in Newfoundland. The model was based on measured or allometrically predicted basal metabolic rates, and BMR mulitples for various activities. Activity budgets of Common Murres were directly measured with electronic recording devices, and daily energy expenditures of Northern Gannets were measured with the doubly labelled water technique. The model was written on a Lotus 1-2-3 computer spreadsheet. The model estimated that Newfoundland seabird colonies require 160,000 t of prey during each breeding season. About half (85,000 t) is used by the Leach's Storm-Petrel, which is the region's most numerous breeding seabird. About 45,000 t, 21,000 t, 5,000 t, and 4,000 t are taken by breeding Common Murres, Atlantic Puffins, Northern Gannets, and Black-legged Kittiwakes, respectively. The model estimated that only 4.0 percent of prey harvest is used for egg formation and chick feeding. This model is one of the first to include actual measurements of time and energy budgets of seabirds. Further empirical data on seabird time and energy use will improve the accuracy of future models of seabird energetics. Computer spreadsheets are superior to traditional programming languages for the development of bioenergetics models because spreadsheets are powerful and flexible, yet require minimal programming skill.

PRESENT STATUS AND TRENDS OF THE KITTIWAKE (*RISSA TRIDACTYLA*) IN THE GULF OF ST-LAWRENCE

Chapdelaine, G. (Canadian Wildlife Service, 1141, route de l'Eglise, P. O. Box 10100, Ste-Foy, Quebec G1V 4H5, Canada)

Over the last 15 years, many changes have occurred on the seabird communities of the gulf of St-Lawrence. Of the 15 well-established nesting species, the Kittiwake is probably the one which increased most. The present work aims to determine the present size of the major colonies in the gulf and to show their respective rates of increase. Little biological information is available to understand this increase. We present such aspects of their breeding biology as clutch-size, breeding, phenology, hatching, and fledging success obtained on Corossol Island in 1985. Herring

Gulls predation was very important on nestling kittiwakes, and the new productivity appeared too low (0, 62 chicks/nest) to maintain the actual level of the population on Corossal.

SEX DIFFERENCES IN THE PARENTAL TIME INVESTMENT OF ATLANTIC PUFFINS

Creelman, E. (Dept. of Psychology, Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X9, Canada)

Activity budgets in breeding Atlantic Puffins (*Fratercula arctica*) were studied on Gull Island, Witless Bay, Newfoundland. Time allocation was categorized as on the slope, in the burrow, and away, and was looked at within four breeding stages. During pre-incubation there was no sex difference in any of the time measures. This may be explained by the more frequent simultaneous arrival and departure of mates during this stage relative to any stage thereafter, suggesting that mates remained in close proximity during that time. Throughout incubation, females spent a greater percentage of time in the burrow than did males, while males spent a greater percentage of time on the slope and away. During brooding, males continued to spend more time on the slope, but no other sex difference occurred. For the remainder of the chick period males spent more time on the slope and in the burrow than did females, while females spent more time away. Females delivered more fish meals per day to chicks than did males. No sex differences occurred in the number, size or species of fish delivered, suggesting that the longer absence by females may have been due to greater time spent foraging for chick meals.

A MODEL OF SEASONAL AND SPATIAL PATTERNS IN THE ENERGY DEMANDS OF SEABIRDS OFF EASTERN AND ARCTIC CANADA

Diamond, A. W. (Canadian Wildlife Service, Ottawa, Ontario K1H 7T5), A. J. Gaston (C.W.S., Ottawa, Ontario, Canada), and R. G. B. Brown (C.W.S., Dartmouth, Nova Scotia, Canada)

The C.W.S. "PIROP" database of numbers of seabirds counted at sea was used as the basis for modelling the monthly energy demands of seabirds in each degree-block of the northwest Atlantic off eastern Canada. The model integrates data on time and energy budgets obtained from intensive studies at breeding colonies, with distributional and behavioral data from the PIROP shipboard surveys, to produce maps of total energy demand by seabirds in each month. It also uses an equation relating energy expenditure to body weight derived specifically from high-latitude seabirds; this gives higher estimates of energy expenditure than those given by equations based on all birds. The various sub-models contributing to the overall model are described briefly, and the model's output summarized by presentation of the maps. Particular emphasis is placed on the limitations of the data available for entering into the model's equations, and for translating total energy demand into estimates of requirements for particular species of prey. Highlights of the results include unexpectedly high concentrations of energy demand off the Labrador Banks, and striking seasonal changes in the structure of seabird "communities" at sea.

OIL-RELATED SEABIRD MORTALITY IN NEWFOUNDLAND WATERS, 1950-1985

Elliot, R. D. (Canadian Wildlife Service, Box 9158, Station B, St. John's, Newfoundland A1A 2X9, Canada) and J. F. Piatt (N.I.C.O.S., Memorial Univ., St. John's, Newfoundland A1B 3X7, Canada)

Mortality of marine birds from oil pollution has been documented in Newfoundland for 25 years, and some beached-bird surveys have been conducted since 1974. Standardized monthly

surveys have been carried out on the southern Avalon Peninsula and Miquelon since January 1984. An average of thirty significant oil spills were reported annually, involving diesel (35 percent), bunker C (28 percent), and other (37 percent) types of oil. Ninety-five percent (n = 20) of samples of oil found on murres and other seabirds apparently killed by oil in 1985 were identified by gas-liquid chromatography as the heavy and resistant bunker C.

Prior to 1984, about 65 percent of beached corpses (n -1928) had some oil on their plumage, compared to 24 percent from the standardized surveys (n -672) since then. Both the overall numbers of corpses and the incidence of oiling were higher in late fall and winter. In recent surveys, highly aquatic winter birds were most likely to be oiled, including seaducks (35 percent), murres (48 percent) and other alcids (23 percent). Summering, coastal and highly aerial species such as shearwaters (0 percent), herring gulls (0 percent) and kittiwakes (11 percent) were less often affected. Initial calculations indicate that less than 100,000 seabirds are killed annually by oil pollution in Newfoundland waters.

MANAGEMENT OF THE TRADITIONAL NEWFOUNDLAND MURRE HUNT

Elliott, R. D., and P. C. D. Ryan, Canadian Wildlife Service, Box 9158, Station B, St. John's, Newfoundland A1A 2X9, Canada

Recent surveys indicate that at least 500,000 murres (95 percent Thick-billed and 5 percent Common) are legally shot each winter in coastal Newfoundland. Murre numbers vary with wind and ice conditions and local availability of preferred food species, such as capelin, Arctic and Atlantic cod, and euphausiids. First-year birds make up about 50 percent of the harvested murres, compared to an estimate of 15-20 percent in the Newfoundland wintering population, and are identified by the absence of supra-orbital ridges.

The annual harvest has probably at least doubled since the 1950's, and it is now primarily a sport rather than a subsistence hunt. Arctic colony monitoring and population modelling indicate that present harvest levels, combined with mortality from oil pollution, fisheries bycatch, native hunting and natural sources, are causing Thick-billed Murre numbers to decline. Public information programmes, enforcement of present laws controlling the hunt, and possible shortening of the hunting season are being undertaken to reduce harvest levels to acceptable levels.

THOUGHTS ON THE USE OF SEABIRDS AS MONITORS OF ECOSYSTEMS AND FISH STOCKS

Furness, R. W. (Zoology Dept., Glasgow Univ., Scotland, United Kingdom)

Seabirds may have an important role to play as monitors of changes in marine ecosystems and fish stocks. Monitoring of ecosystem and fishery effects may best be in terms of the changes in numbers of breeding seabirds, their breeding success, chick growth rates, adult activity budgets or diets.

Some relationships appear to be simple. Clyde Herring catch-per-unit-effort correlates with tern breeding numbers two years earlier. West Norwegian puffin breeding success correlates with herring stock size. However, interactions can be complex. I discuss our recent studies of inter-relationships between numbers, breeding performances and diets of scavenging seabirds around Shetland, availability of food from fishing vessels and interspecific relations between seabirds.

LIMITS OF ACCURACY OF SHIPBOARD SURVEYS FOR SEABIRDS

Gaston, A. J., A. W. Diamond, and B. L. Collins (Canadian Wildlife Service, Ottawa, Ontario K1A 0E7, Canada)

Shipboard surveys have been used extensively to determine the distribution and relative abundance of seabirds at sea. Recently, attempts have been made to estimate absolute densities in order to estimate energy use by seabirds and hence their role in marine ecosystems. We discuss different approaches to the problems presented by seabirds at sea and define the probable limits of accuracy of these procedures. We also describe conversion factors we have developed to convert PIROP counts into density estimates and compare these to results from aerial surveys.

FURTHER EXPANSIONS ON THE ALLOMETRY OF FEEDING IN SYNTOPIC SEADUCKS

Goudie, R. I. (Canadian Wildlife Service, St. John's, Newfoundland, Canada)

Calder (1974) and Peters (1983) considered that ingestion rate should be proportional to $m^{0.75}$, where m = mass in grams. The ingestion rate is the produce of two functions, namely: proportion of time spent feeding ($m^{-0.25}$ theoretical value of Calder, 1974), and energy density of food (i.e., energy/g wet weight x capacity of gullet) consumed when feeding ($m^{1.0}$ theoretical value of Calder, 1974). Goudie and Ankney (in press) presented experimental data for four species of seaducks *Histrionicus histrionicus* (m = 610 ± 68 (s.d.), *Clangula hyemalis* (m = 750 ± 93), *Melanitta nigra* (m = 1020 ± 97), *Somateria mollissima* (m = 1790 ± 149) wintering in the coastal area of Cape St. Mary's, southeastern Newfoundland which showed that these species approximated the predictions of the 3/4 law.

It seems likely that the 3/4 law applies to other guilds of seabirds, e.g., the Alcidae, and warrants further empirical testing. Implications from data on seaducks suggest that feeding morphology can be varied provided that the birds forage by similar modes (e.g., pursuit divers), and are subjected to the same or similar external environments. Comparisons across varied taxa are likely to be invalid. Further confirmation of the 3/4 law for seabirds, such as Alcids, could allow the indirect determination of proportion of time spent feeding or energy density of foods. This could be especially valuable for application during times when these birds are difficult to study.

DO BIRDS SEARCH FOR FISHES LIKE ICHTHYOLOGISTS DO?

Green, J. M. (Dept. of Biology and Marine Sciences Research Laboratory, Memorial Univ. of Newfoundland, St. John's, Newfoundland, Canada)

We have been using scuba diving techniques to investigate the distribution and abundance patterns of benthic marine fishes in northern Hudson Bay. Three of the species of benthic fishes (*Stichaeus punctatus*, *Eumesogrammus praecisus* and *Gymnelus viridis*) are the principal prey that black guillemots in the study area feed to their chicks. Our studies show that the relative abundances of the three species in our quantitative benthic samples closely correspond with their relative abundances in chick diets. Behavioral differences we have observed between species, and between size classes within species, are expected to be important in determining the frequency with which different species and size classes are caught by black guillemots. Our studies further show that recruitment in these fish species is highly variable between years. The occurrence of two or more successive years of poor recruitment is expected to be reflected in changes in the foraging behavior of black guillemots.

CHANGES IN DISTRIBUTIONS OF BLACK-LEGGED KITTIWAKES AND ARCTIC TERNS WHICH REFLECT RECENT INCREASES IN THE ABUNDANCE OF *AMMODYTES SP* IN THE WESTERN NORTH ATLANTIC OCEAN

Lock, A. R. (Canadian Wildlife Service, Bedford Institute of Oceanography, P. O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2, Canada

Shortly before 1970, notable increases in the abundance of *Ammodytes sp* occurred in Europe and in North America. Contemporaneous changes in distributions of Black-legged kittiwakes and Arctic Terns in North America are attributed to this change in food abundance. Kittiwakes were first found breeding in Nova Scotia, south of their traditional breeding range; in 1971 and since that time the number of kittiwake colonies has increased to five, and the number of breeding pairs has increased at a mean rate of 16 percent per annum. At the same time, immature Arctic Terns, which usually summer south of the breeding range, began appearing at colonies in increasing numbers. These immatures, which had previously made up less than 1 percent of birds at colonies, now often constitute one-third of the birds present.

BIOLOGICAL CHARACTERISTICS OF CAPELIN (*MALLOTUS VILLOSUS*) AT WITLESS BAY NEWFOUNDLAND

Methven, D. A., and J. F. Piatt (NICOS, Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X9, Canada)

Fluctuations in abundance, size, and sex composition of capelin can affect the foraging efficiency of common murres and Atlantic puffins which breed at Witless Bay, Newfoundland from May to August. Capelin occurred inshore each year from May to August but declined in abundance from 1982 to 1984. Abundance peaked in late June and early July and declined after mid-July as spawning was ending. Most capelin were concentrated in the upper water column (generally < 20 m), above the 5°C isotherm. Seasonal fluctuations in abundance were correlated with periods of maximal tidal oscillations and increasing water temperature. Capelin did not appear to undergo diel vertical migrations at Witless Bay.

Female capelin, especially ovid females, were more abundant than males (F/M = 1.56), however males dominated collections towards the end of the spawning period in late July. Male capelin were significantly larger than females. Length, and especially weight of males and females decreased by as much as 30-40 percent through the spawning period. Older capelin (3-5 yr) arrived nearshore first, younger and smaller capelin (2-3 yr) were more abundant in late July.

THE NEWFOUNDLAND INSTITUTE FOR COLD OCEAN SCIENCE SEABIRD WORKSHOP - 23-26 MARCH 1986

Montevecchi, W. A. (Newfoundland Institute for Cold Ocean Science and Dept. of Psychology, Memorial Univ., St. John's, Newfoundland A1B 3X9, Canada

As an outgrowth of a perceived need to allow marine scientists in eastern Canada the opportunity to present and discuss current research projects, the Newfoundland Institute for Cold Ocean Science (NICOS) with the help of the Canadian Wildlife Service hosted a workshop to this end. Researchers from eastern Canada and a few from afar participated. Oral presentations and a few posters were grouped roughly in the following thematic sessions: (1) Diets/Foraging/Energetics, (2) Birds at Sea, (3) Seabirds as Monitors of the Marine Environment, (4) Population Dynamics,

and (5) Patterns of Mortality. Presentation sessions were complemented with topical round table discussions that were designed to generate specific research recommendations whenever useful possibilities arose. Round table discussions focused on the following themes: (1) Research/ Management Interactions, (2) Information Needs for Models of Seabird Energetics and Prey Harvests, (3) The Role of Long-Term Population Studies in Monitoring Seabirds, and (4) Gull Problems in Eastern Canada. As can be seen from the round table abstracts, the chairpersons were effective, and a number of new collaborative research ventures were initiated. The meeting ended with a consensus that the exercise had been a worthwhile one, and it was agreed that another workshop would be organized for 1988. We thank the Editor of the *Pacific Seabird Group Bulletin* for the opportunity to publish the abstracts of the workshop presentations. We welcome inspiration from distant shores.

WHAT GANNETS CAN TELL FISHERMEN ABOUT FISHERIES CONDITIONS

Montevecchi, W. A., V. L. Birt, and D. K. Cairns (Dept. of Psychology and Newfoundland Institute for Cold Water Science, Memorial Univ., St. John's, Newfoundland A1B 3X7, Canada)

Northern Gannets *Sula bassanus* feed on a variety of surface schooling, commercially exploited (Atlantic saury, sand lance) prey in Newfoundland. Calculations of the mean prey requirements of the gannet population in Newfoundland indicate that the birds' needs often exceed total commercial landings. Inter-annual comparisons of the gannets' food harvests with local unrestricted fisheries catch statistics show that collapses of the avian and human harvests of mackerel (1982), the gannets' most common prey, and squid (1983, 1984, 1985) correspond exactly over an eight-year data series (1977-85). The probability that these matches occurred by chance can be rejected with a random permutation model ($P < .006$), indicating that the seabirds and fisheries data are not independent. Correlational analyses of the relative abundances of avian prey with fisheries landings were significant for squid but not for mackerel. These findings indicate that seabirds monitored large scale but not finer scale fishery fluctuations, which are expected to appear in analyses of longer term data sets. Herring stocks in Newfoundland have been weak for the past decade or so. Negative (statistically nonsignificant, $P < .10$) correlations between gannet food harvests and herring (i) landings, (ii) effort indices, (iii) biomass estimates, and (iv) total allowable catch (TAC) quotas suggest competition between the seabirds and the fishery. The seabird data are also informative with regard to pelagic species that are not conventionally surveyed. No data on abundance or movement patterns of noncommercial species exist. Recent increases in the availability of Atlantic saury in the waters off northeastern Newfoundland are indicated by the high levels of the gannets' food harvests in 1984 and 1985. These findings implicate the potential usefulness of systematically surveying pelagic fish and investigating potential new commercial fishery ventures when the availability and/or stocks of other pelagic species (e.g., squid, herring) are low.

AT-SEA FORAGING BEHAVIOUR OF COMMON MURRES AND ATLANTIC PUFFINS

Piatt, John F. (Newfoundland Institute for Cold Ocean Science, Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X7, Canada)

At-sea studies of temporal and spatial patterns of association between Common Murres, Atlantic Puffins, and capelin were conducted during the summers of 1982-84 around the Witless Bay Seabird Sanctuary, Newfoundland, Canada. Seasonal abundance and flock sizes of murres and puffins in the study area were strongly correlated with local abundance and density of capelin schools. Murres were correlated with higher density aggregations of prey than puffins, and this was

reflected in their foraging behavior (larger more aggregated flocks than puffins). Temporal overlap in habitat use by murres and puffins was moderate and related to capelin abundance. During periods of co-occurrence, spatial overlap was very low. Murres were found in deeper waters where capelin school densities were high while puffins were located in shallow, nearshore waters with typically lower capelin school densities. Spatial overlap of birds was independent of capelin abundance. Both murres and puffins exhibited threshold responses to capelin school densities, with murres having a significantly higher density threshold requirement for foraging. Prey density thresholds were not fixed, but rather changed daily in apparent response to daily variations in density and distribution of capelin around the colony. Interspecific differences in prey density thresholds may be explained by differences in metabolic demand life-history strategies of these species.

DIETS OF COMMON MURRES AND ATLANTIC PUFFINS IN RELATION TO PREY ABUNDANCE AT WITLESS BAY, NEWFOUNDLAND

Piatt, John F., and David A. Methven (Newfoundland Institute for Cold Ocean Science, Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X7, Canada)

The diets of 1,358 adult common murres (*Uria aalge*) and 449 adult Atlantic puffins (*Fratercula arctica*) were examined over three years (1982-1984) at Witless Bay, Newfoundland. Expressed as percent number, capelin (*Mallotus villosus*) were the most common prey taken by murres and puffins in most years, although juvenile cod (*Gadus morhua*) and sandlance (*Ammodytes dubius*) were often important in diets. Expressed as percent weight, capelin were overwhelmingly dominant in all years for both bird species. There was a highly significant decline in the average numbers of capelin found in locally collected birds' stomachs from 1982 to 1984, corresponding to a progressive decline in local capelin abundance from 1982 to 1984. On a smaller time scale, the number of capelin in stomachs was significantly correlated with local capelin abundance; the form of the relationship being sigmoidal, indicating that both bird species have minimum capelin density requirements for achieving satiation. The proportion (by number) of capelin in total diets, as indicated by proventriculus contents, was not correlated with local capelin abundance, presumably because birds fed on capelin away from the study area when local capelin abundance was low. Although murres took an overall larger mean size of prey than puffins, few significant differences in prey size distributions were observed when specific sex or age-classes of prey were compared. Dietary overlap between murres and puffins was extremely high. Diet diversity was extremely low in all years, with puffins having a higher overall diet diversity than murres.

RECRUITMENT TO THE BREEDING GROUP IN THE BLACK-LEGGED KITTIWAKE (*RISSA TRIDACTYLA*)

Porter, J. M. (Biology, Acadia Univ., Wolfville and Canadian Wildlife Service, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada)

The process of recruitment to the breeding group in the Black-legged Kittiwake was examined at the North Shields, England colony. This study was facilitated by the extensive long-term banding program of all breeders, which allowed unbanded birds to be identified as recruits (first-time breeders) and prospectors (birds which did not breed in that year and had never bred). Competition for nest sites in the colony produces a large pool of birds in adult plumage which are nonbreeding (prospectors). Certain features separated recruits from prospectors including age, attendance at the colony, arrival date, and body weight. There was further selection at the time of recruitment. Recruits employed three strategies: (1) one group arrived early and took up high

quality nest sites with experienced mates; (2) a second group arrived slightly later and waited on the periphery of the colony until aggression from experienced breeders declined and then established nest sites in the preferred high density areas; and (3) the third group, which arrived at the same time as (2), took up less favorable sites immediately on arrival at the colony. High quality pairs obtained sites close to other pairs and bred more successfully. The results emphasize the importance of investigating the process of recruitment and the pool of potential recruits in seabirds. Knowledge of how young animals first enter the reproductive portion of the population is basic to the understanding of population dynamics. The results of this study are the basis for an investigation of the mechanisms responsible for the recent expansion in kittiwake numbers and range in Atlantic Canada and the Gulf of St. Lawrence.

YET MORE ON EFFECTS OF PUFFIN/GULL INTERACTIONS ON PUFFINS

Rice, J. (Dept. of Fisheries and Oceans, St. John's, Newfoundland, Canada)

I studied the breeding success of puffins at three sites on Gull Island, Witless Bay, and the behavior of the puffins when provisioning chicks. The sites differed greatly in numbers of Herring Gulls; extremely abundant at East, a couple dozen at Saddle, and very few at West. The study was conducted in 1978 and 1979, when the capelin stocks in Newfoundland waters were extremely low. Fledging success and weight at fledging of puffins were low, but did not differ amond sites, despite the great differences in numbers of gulls present. The patterns of both chick weight change and numbers of puffins returning to the colony with food indicated foraging conditions were frequently poor, but periods of good foraging did occur. Variations in both attributes were synchronous across the three sites, again despite the great variation in gull numbers. The likelihood of gull attacks occurring increased on days when foraging was good. Puffins had several proximate behavioral responses to potential gull kleptoparasitism, and use of these activities also varied with puffin foraging success. The parallel changes in likelihood of gull attacks and puffin behaviors when approaching their burrows combined to result in a constant per capita frequency of kleptoparasitic attack, independent of both slope (gull abundance) and puffin foraging success. Such results are consistent with expectations from foraging theory. They imply that programs to reduce kleptoparasitism through gull control are unlikely to be either necessary, or particularly effective, unless nearly 100 percent of gulls are removed.

A GRADIENT MODEL OF ENERGY DISSIPATION BY PELAGIC BIRDS

Schneider, D. C. (Newfoundland Institute for Cold Ocean Science, Memorial Univ. of Newfoundland, St. John's, Newfoundland A1B 3X7, Canada)

Flow gradients in the surface layer of the ocean can concentrate seabird prey in at least three different ways: concentration of passive prey at the sea surface by divergent flow, concentration of buoyant or vertically migrating prey in areas of convergent flow, and behavioral responses of actively moving prey to physical, chemical, or biological gradients associated with flow gradients. The seasonal evolution of flow gradients in shelf ecosystems is accompanied by seasonal development of physical gradients in temperature, salinity, and water density. These observations suggested that the rate at which pelagic birds dissipate energy in an area in search of prey might be proportional to locally averaged physical gradients. A formal model based on lateral salinity gradients explained 62 percent of the seasonal variation in energy dissipation by pelagic birds in the southeastern Bering Sea. Gradient models may prove useful in modelling seasonal energy dissipation by pelagic birds in mid-latitude shelf ecosystems in the Atlantic.

RED FOX (*VULPES FULVA*) PREDATION ON THE BREEDING SEABIRDS OF BACCALIEU ISLAND, NEWFOUNDLAND

Sklepkovych, B. O. (Psychology Dept., Memorial Univ. of Newfoundland, St. John's, Newfoundland, Canada)

Red Foxes have inhabited Baccalieu Island since winter 1959-1960. In view of the devastating effects terrestrial predators may have on island-nesting seabirds and the lack of alternative prey on Baccalieu, efforts were made to determine the foxes' impact on the resident seabird populations.

Fox predation was assessed by examining fecal composition and avian prey remains. Leach's Storm-Petrels (*Oceanodroma leucorhoa*) made up 77-79 percent of scat by weight and 89-95 percent of remains. Based on these proportions and the estimated energy requirements of the resident fox population, 31,000 ± 3,000 adult storm-petrels would be taken annually from an existent population estimated at 3,430,000 ± 324,000 pairs. Factors which tend to keep predatory impact at low levels are the size of the petrel population and the limitation of the fox population due to the scarcity of winter food (and occasional hunting pressure). Black-Legged Kittiwakes (*Rissa tridactyla*), Atlantic Puffins (*Fratercula arctica*), Common Murres (*Uria aalge*), and Northern Gannets (*Morus bassanus*) constitute 19 percent of scat weight and 11 percent of avian remains. The high availability of Leach's Storm-Petrels appears to hold impact on each of these species at $\leq$ 1 percent of the adult breeding populations. Herring Gulls (*Larus argentatus*) and Greater Black-Backed Gulls (*Larus marinus*) nest on nearby Puffin Island (150 m west of Baccalieu). The presence of foxes on Baccalieu may deter these avian predators from nesting and from preying extensively on the burrow-nesting seabirds on the island.

MANX SHEARWATERS BREEDING IN NEWFOUNDLAND: PREDICTING WHICH ISLANDS MAY BE COLONIZED

Storey, A. E. (Dept. of Psychology, Memorial Univ., St. John's, Newfoundland, Canada)

Since the initiation of the first North American colony of Manx Shearwaters on Middle Lawn Island, Newfoundland in 1977, interest has been generated about whether other uninhabited islands also have developing colonies. Based on behavioral and habitat data from this first colony, potential breeding sites would be islands (a) with low breeding populations of gulls, (b) with rock-earth habitat that would allow breeders to dig or find long burrows, and (c) with weather conditions resulting in many nights of low illumination (e.g., extensive fog) for courtship activities of unpaired birds. Accurate population estimates in these new colonies may be difficult to obtain because most of the attending birds are young nonbreeders. Use of taped courtship calls and artificial burrows to estimate population size and breeding condition of birds will be discussed.

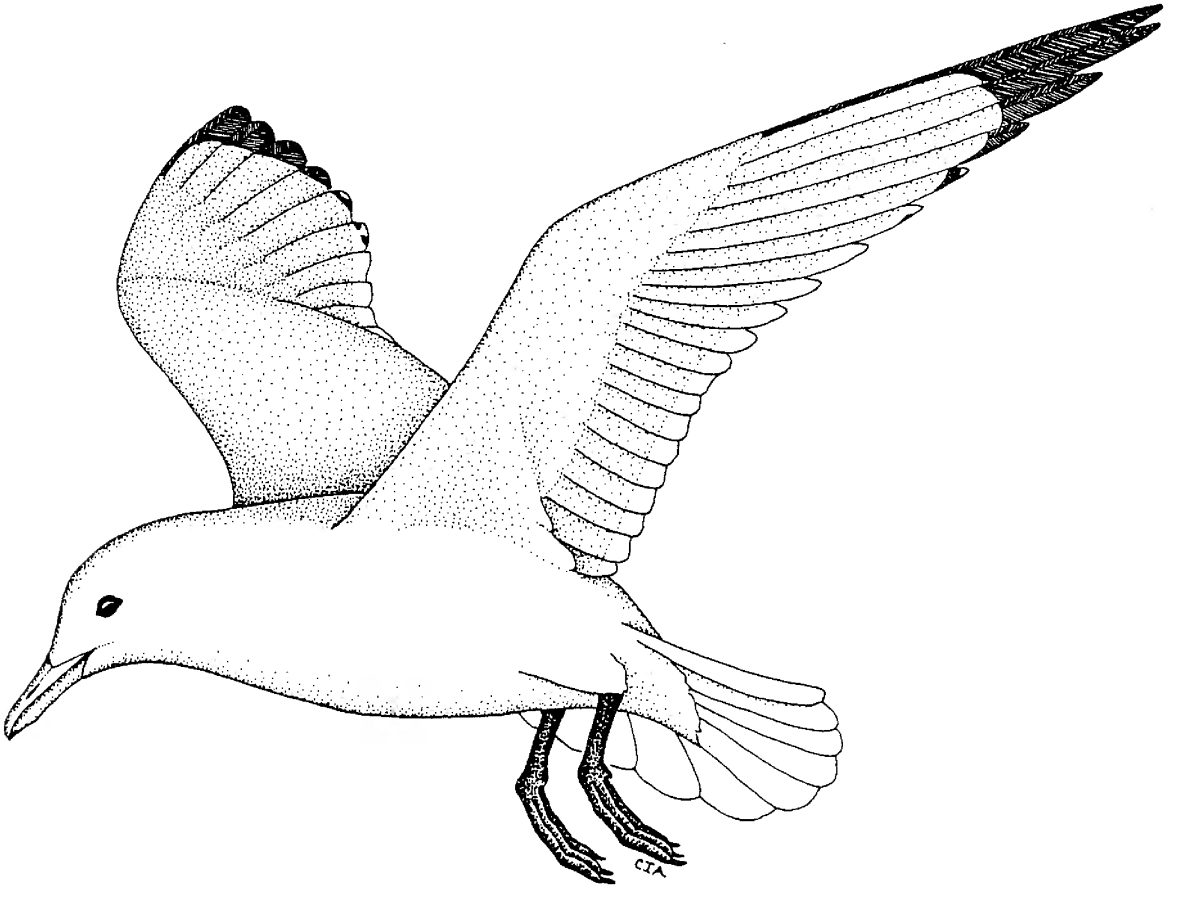
PARASITES: AN IGNORED FACTOR IN THE STUDY OF THE ENERGETICS AND FOOD OF SEABIRDS

Threlfall, W. (Dept. Biology, Memorial Univ., St. John's, Newfoundland A1B 3X9, Canada)

An integral component of all ecosystems is the presence of parasites (both ecto- and endo-). Few ornithologists spare more than a passing thought to their presence on/in birds, despite the fact that parasites of humans and domestic animals are known to cause mechanical damage, withdraw metabolites, have toxic effects, and allow the entry of pathogenic organisms that cause secondary infections.

Our basic knowledge of the parasites of seabirds is confined almost entirely to taxonomic studies, with little work having been undertaken on life-cycles or pathological effects. It is known that parasites of domestic animals can cause both decreased weight gains and weight loss. However, during wildlife studies, including the study of seabird chick growth and energetics, the possible effects of parasites are never considered. Variations on growth and/or food conversion rates in a given bird species may result from differences in parasite burdens in different geographical areas rather than being a reflection of differences in bird physiology or food quality.

Life-cycles of parasites may be direct, involve one or more intermediate hosts or a vector. A knowledge of these life-cycles could be used by ornithologists during studies of seabird diets. It will be shown that the presence or absence of parasites on/in a bird may also be used as an indicator of the health of the environment.



NEW PUBLICATIONS

Guia para identificar las aves marinas colombianas. Parte 1: Caribe. 1979. Luis German Naranjo Henao. Informes Museo del Mar No. 25. 65 pp.

and

Guia para identificar las aves marinas colombianas. Parte 2: Pacifico. 1980. Luis German Naranjo Henao. Informes Museo del Mar No. 25. 79 pp.

These two mimeographed guides to the seabirds and shorebirds of Colombia in the Caribbean and the Pacific. They include brief keys to orders, followed by species accounts. These accounts include simple line drawings, descriptions, ranges (both worldwide and in Colombia) and habitat. The guides are important in updating the lists of species along the coasts of Colombia. They include both species that have been observed and others that have not yet been recorded but are likely to show up. They are written in Spanish with brief Spanish and English introductions. Correspondence concerning the guides should be addressed to: Dr. Jorge Barreto Soulier, Director Museo del Mar, Calle 23, No. 4-47, Bogota, Colombia.

The Atlas of the Breeding Birds of Ontario. 1987. Michael D. Cadman, Paul F. J. Eagles, George R. Francis and Frederick M. Helleiner (editors). 600 pp. University of Waterloo Press.

The *Ontario Breeding Bird Atlas* is to be published around February 1987 by the University of Waterloo Press. The project was sponsored by the Federation of Ontario Naturalists and the Long Point Bird Observatory. Outside Canada the atlas can be ordered by remitting $53.50 (U.S.) to Ontario Breeding Bird Atlas, c/o University of Waterloo Press, Dana Porter Library, University of Waterloo, Waterloo, Ontario, Canada, N2L 3G1.

Malcolm C. Coulter

Ontario Breeding Bird Atlas

The *Ontario Breeding Bird Atlas* is to be published in 1987 by the University of Waterloo Press. The project was sponsored by the Federation of Ontario Naturalists and the Long Point Bird Observatory. Outside Canada the atlas can be ordered by remitting $43.50 (U. S.) to Ontario Breeding Bird Atlas, c/o Univ. of Waterloo Press, Dana Porter Library, Univ. of Waterloo, Waterloo, Ontario, Canada, N2L 3G1.

Hans Blokpoel

BULLETIN BOARD

Auks of the World

Asa Thoresen completed a book *Auks of the World* in 1980, but due to lack of funds, the publisher has not yet published the book. Asa would like to inform those PSG members who loaned her photographs for her book that she has not forgotten them and that she hopes the book will appear next October.

Copper River Delta/Orca Inlet Facilities

Goose Cover Lodge on Orca Inlet, adjacent to the Copper River Delta, Alaska, was opened this spring. A large fraction of the estimated 20 million shorebirds that use this area in the spring can be observed and studied on the flats immediately in front of the lodge. Goose Cove Lodge is owned and operated by Pete and Belle Mickelson. Pete has been studying Alaskan geese for over 15 years, and Belle is active in Alaskan environmental education. A full program is available for birdwatchers and other vacationers. Special arrangements may be available for researchers wishing to work in the area. For particulars, contact: Pete and Belle Mickelson, Alaska Wildwings, Dept. PSG, Box 325, Cordova, AK 99574.

Ornithological Monographs, Discounted

The American Ornithologists' Union is offering a package of eight *Ornithological Monographs* at half price:

1965. A Comparative study of some social communication patterns in the Pelecaniformes. G. F. van Tests. 88 pp.

1967. Adaptations for locomotion and feeding in the Anhinga and the Double-crested Cormorant. O. T. Owre. 138 pp.

1974. The Red-tailed Tropicbird on Kure Atoll. R. R. Fleet. 64 pp.

1975. Comparative behavior of the American Avocet and the Black-necked Stilt (Recurvirostridae). R. B. Hamilton. 98 pp.

1975. Breeding biology and behavior of the Oldsquaw (*Clangula hyemalis* L.). R. M. Alison. 52 pp.

1977. Maintenance behavior and communication in the Brown Pelican. R. W. Schreiber. 78 pp.

1984. The marine ecology of birds in the Ross Sea, Antarctica. D. G. Ainley, E. F. O'Connor, and R. J. Boekelheide. 97 pp.

1984. Pattern, mechanism, and adaptive significance of territoriality in Herring Gulls (*Larus argentatus*). J. Burger. 92 pp.

The regular price is $50.50. The special package price is $25.00 + $1.50 for handling and shipping in North America ($5.00 for elsewhere).

Order from: Dr. Frank R. Moore, Dept. of Biological Sciences, Univ. of Southern Mississippi, Southern Station Box 5108, Hattiesburg, Mississippi 39406.

Make checks payable in U.S. dollars to American Ornithologists' Union.

Field Studies on Reef Island, Queen Charlotte Islands

The Queen Charlotte Islands of British Columbia have recently attracted much publicity through a vigorous campaign to protect their remaining virgin coastal rainforests. For the past three years, the Canadian Wildlife Service has been carrying out research on Ancient Murrelets on Reef Island, a small (3 km x 1 km) island to the east of the main archipelago. Additional banding studies have also been initiated on Cassin's Auklet and Fork-tailed Storm-Petrels. The island provides good opportunities to study all of the above species. It also supports smaller numbers of Pelagic Cormorants, Pigeon Guillemots and Glaucous-winged Gulls and provides interesting sea-watching for birds moving through Hecate Strait.

The Canadian Wildlife Service hopes to maintain a presence on the island over the next few years. We would welcome collaboration from university groups or private individuals who would like to carry out research on the seabirds or any other part of the biota and would be happy to share existing facilities (a small hut), the cost of additional facilities, if necessary, and the costs of supplying and maintaining the camp. Access is available from Sandspit, connected by air with Vancouver and by ferry with Prince Rupert and Port Hardy. From Sandspit, a large party can charter a fishing boat, or a smaller group can reach the island by Zodiac. Reef Island is probably the most readily accessible and driest of the Queen Charlotte's seabird colonies. Anyone interested in collaborative research there should contact before January 1987: A. J. Gaston, Canadian Wildlife Service, Ottawa, Ontario K1A 0E7, Canada.

Seabirds of the Marianas Islands

Phil Glass, wildlife biologist biologist for the Commonwealth of Northern Marianas, is embarking on a two-year project to map and census the colonial seabird colonies of the Marianas Islands. He would appreciate any contact from people who are working on seabirds in the western Pacific. You can reach him at the Division of Fish and Wildlife, Commonwealth of Northern Mariana Islands, Saipan, C.M. 96950.

Work on Colonial Birds

J. P. Ryder has suggested that students interested in graduate work (M. Sc.) on colonial birds can write to him at the Biol. Dept. Lakehead Univ., Thunder Bay, Ontario, Canada, P7B 5E1.

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